TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

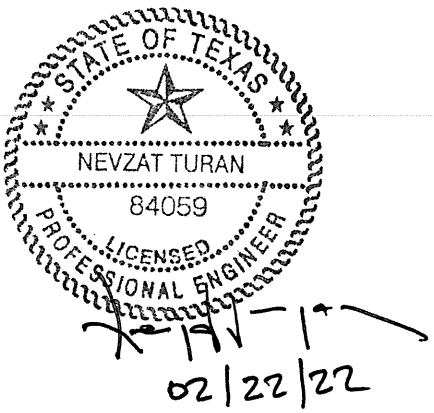
MAJOR PERMIT AMENDMENT APPLICATION

VOLUME 4 OF 6

Prepared for

Texas Regional Landfill Company, LP

February 2022



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WCG Project No. 0771-368-11-123

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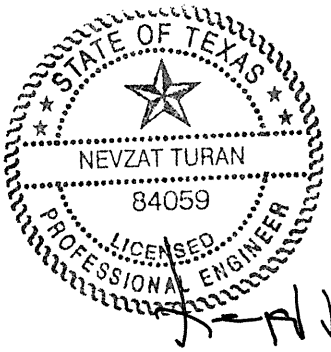
CONTENTS

PART III - SITE DEVELOPMENT PLAN

Appendix IIIG – Geology Report

Appendix IIIH – Groundwater Monitoring, Sampling, and Analysis Plan



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PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIG
GEOLOGY REPORT

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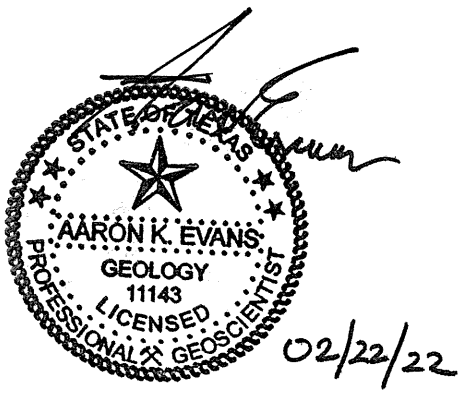

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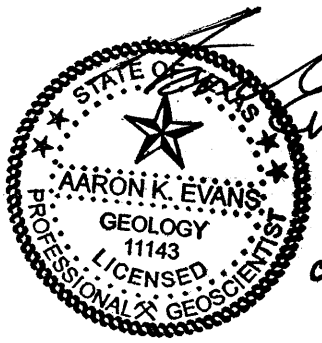

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CONTENTS

LIST OF TABLES **IIIG-iv**

GEOLOGY REPORT CERTIFICATION **IIIG-v**

1 INTRODUCTION **IIIG-1**

2 REGIONAL GEOLOGIC/HYDROGEOLOGIC INFORMATION **IIIG-2**
2.1 Regional Physiography and Site Topography IIIG-2
2.2 Regional Geology IIIG-2
2.2.1 Geologic History IIIG-2
2.2.2 Regional Structural Geology IIIG-3
2.2.3 Regional Stratigraphy IIIG-3
2.3 Geologic Processes IIIG-6
2.3.1 Fault and Seismic Data IIIG-6
2.3.2 Erosional Processes IIIG-6
2.3.3 Wetlands Identification IIIG-6
2.4 Regional Aquifers IIIG-6
2.4.1 Woodbine Aquifer IIIG-6
2.4.2 Trinity Aquifer IIIG-7
2.5 Water Well Search IIIG-8
2.6 Site Reconnaissance IIIG-12

3 SUBSURFACE INVESTIGATION REPORT **IIIG-13**
3.1 Site Stratigraphy IIIG-13
3.1.1 Existing Borehole Data IIIG-13
3.1.2 Upper Sand Unit IIIG-14
3.1.3 Bounding Shale Unit IIIG-14
3.1.4 Lower Sand Unit IIIG-15
3.1.5 Woodbine Aquifer Zone IIIG-15
3.2 Soil Boring Plan IIIG-17
3.3 Previous Site Exploration Summary IIIG-17

4 GROUNDWATER INVESTIGATION REPORT **IIIG-23**
4.1 Water Level Measurements IIIG-23
4.2 Permeability of the Uppermost Aquifer IIIG-31
4.3 Hydrogeologic Interpretation IIIG-33
4.3.1 Uppermost Aquifer IIIG-33
4.3.2 Lower Confining Unit IIIG-35

CONTENTS (Continued)

	4.3.3 Groundwater Monitoring System	IIIG-35
4.4	Class 1 Waste Disposal Area Location Restrictions	IIIG-35
	4.4.1 Compliance with 30 TAC §335.584(b)(1)	IIIG-36
	4.4.2 Compliance with 30 TAC §335.584(b)(2)	IIIG-36
4.5	Contaminant Pathways	IIIG-37
4	**REFERENCES**	**IIIG-38**

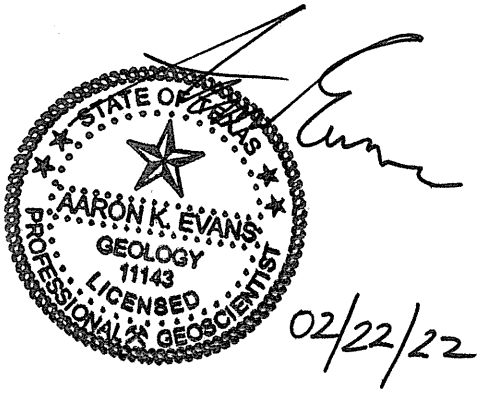
APPENDIX IIIG-A
Regional Geologic/Hydrogeologic Data

APPENDIX IIIG-B
Site Exploration Data

APPENDIX IIIG-C
Site Geologic Data

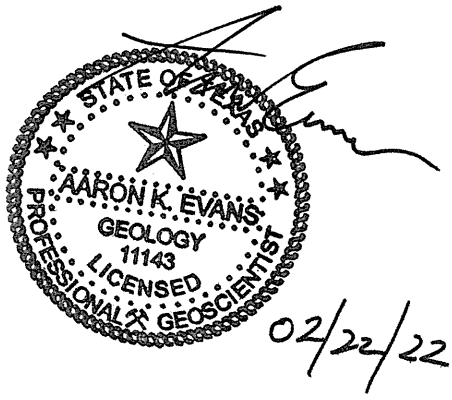
APPENDIX IIIG-D
Site Hydrogeologic Data

APPENDIX IIIG-E
2021 Soil Boring Plan and TCEQ Approval Letter



TABLES

Table		Page No.
2-1	Regional Stratigraphy in the Vicinity of Turkey Creek Landfill	IIIG-5
2-2	Regional Hydraulic Properties and Water Quality Parameters in the Woodbine and Paluxy Aquifers	IIIG-8
2-3	Registered Water Wells Within 1 Mile of Turkey Creek Landfill	IIIG-10
3-1	Summary of Existing Boring Depths and Elevations	IIIG-18
4-1	Subtitle D Monitoring Event Groundwater Elevations	IIIG-21
4-2	2021 Landfill Expansion Groundwater Elevations	IIIG-29
4-3	Summary of Hydraulic Conductivity Results	IIIG-31



GEOLOGY REPORT CERTIFICATION

Site Information

Site: Turkey Creek Landfill

Site Location: Johnson County

MSW Permit No.: 1417D

Qualified Groundwater Scientist Statement

I, Aaron K. Evans, am a Texas-licensed professional geoscientist and a qualified groundwater scientist as defined in Title 30 TAC §330.3(120). I have prepared the Geology Report which constitutes Appendix IIIG of this permit application. In my professional opinion, the Geology Report is in compliance with the requirements specified in Title 30 TAC §§330.63(e). This report has been completed specifically for the Turkey Creek Landfill. The only warranty made by me in connection with this report is that I have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of my profession, practicing in the same or similar locality. No other warranty, expressed or implied, is intended.

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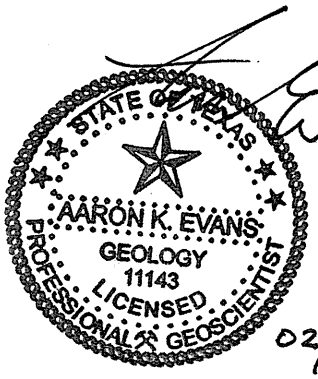
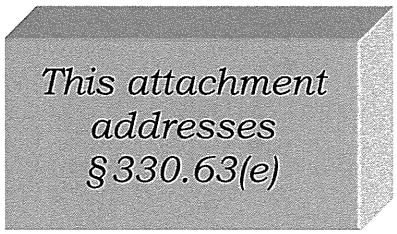


02/22/22

Signature: _____
Aaron K. Evans, P.G., Texas License No. 11143

Date: 02/22/22

1 INTRODUCTION



This Geology Report has been prepared for the Turkey Creek Landfill facility pursuant to the lateral landfill expansion in accordance with Texas Commission on Environmental Quality (TCEQ) Municipal Solid Waste (MSW) rules in Title 30 Texas Administrative Code (TAC) §330.63(e). Regional and site-specific geologic and hydrogeologic information are discussed in of this report. The supporting regional and site-specific data are provided within the report text and the accompanying Appendices (IIIG-A through IIIG-E).

2 REGIONAL GEOLOGIC/HYDROGEOLOGIC INFORMATION

2.1 Regional Physiography and Site Topography

According to USGS 7.5-minute topographic maps of the landfill area (reference Figure IIIG-A-6 in Appendix IIIG-A), the topography in the landfill vicinity generally slopes from west to east. The pre-development natural ground surface elevations within the existing permit boundary area ranged from a high of approximately 730 ft-msl along the southwestern boundary to a low of approximately 645 ft-msl at the northernmost extent of the permit boundary approaching Turkey Creek. The site is bounded on west and east by unnamed tributaries that flow northward and discharge into the Turkey Creek floodway. Turkey Creek flows along the northern permit boundary toward the east. According to the USGS topographic map, the majority of the predeveloped facility area consisted of a topographic lobe extending from the southwest property boundary with relief on the west, east, and north. This lobe structured feature results from differential erosion by the bounding stream courses.

According to the Bureau of Economic Geology (BEG, 1996), the landfill is located in the Black Prairie regional physiographic province. The Black Prairie typically has a relatively flat to undulating surface topography that slopes gently to the east. It is described by the BEG as poorly drained with sparse timber.

2.2 Regional Geology

2.2.1 Geologic History

Geologic formations in the site vicinity are predominately Cretaceous-age sediments. These sediments were deposited by northward advancing seas over the underlying eroded Paleozoic strata. The Cretaceous-age Comanche Series and Gulf Series sediments represent two major regional sea transgressions. Marine deposition halted toward the end of the Cretaceous period with retreat of seas gulfward, driven by regional uplifting to the west. Erosion of Cretaceous-age sediments began and continued through the Cenozoic Era to present. This erosion produced limited areas of Quaternary alluvium and terrace deposits along stream courses. The landfill is underlain by the Cretaceous-age upper Gulf and Comanche Series sediments with quaternary alluvium present at the surface near the northern and northeastern portion of the facility.

2.2.2 Regional Structural Geology

According to Harden, et al. (2004), a wide range of structural features affected the deposition of the Trinity and Woodbine aquifers regionally. Figure IIIG-A-2 – (Regional Structural Features Map) presents the major regional structural geologic features. During the formation of Pangea in the late Paleozoic era, tectonic collisions uplifted and deformed the southern margin of the Laurasian paleocontinent. This tectonic event uplifted the Ouachita Mountains, which were source rock areas for the later deposition of the Trinity and Woodbine sediments (Caughey, 1977). With the early Mesozoic breakup of Pangea, continental rifting occurred to the southeast of the Ouachita Fold Belt which created low-lying areas that were subsequently flooded during the Jurassic to form the ancestral Gulf of Mexico (Stearn et al., 1979). During this time, the climate was hot with relatively restricted marine flow in the ancestral Gulf of Mexico which caused the deposition of evaporate deposits.

As the ancestral Gulf of Mexico widened during the Mesozoic era, drainage patterns in the area shifted to the southeast, and deposition of the Trinity sediments was initiated in the Early Cretaceous. As the Trinity/Woodbine sediments accumulated, the East Texas Basin underwent syndepositional subsidence (Oliver, 1971), which served to foster the formation of the basinward thickening wedge of sediments that characterize the Cretaceous formations in north Texas. Continued subsidence in the Gulf of Mexico Basin during the Tertiary Period advanced the formation of the Balcones Fault Zone which runs from Central Texas to south of Dallas.

2.2.3 Regional Stratigraphy

Regional stratigraphy consists of Cretaceous-age Gulf Series (Eagle Ford and Woodbine formations) and Comanche Series (Washita, Fredericksburg, and Trinity groups) sediments. Stratigraphic positions, general lithologic characteristics, and approximate depths and thicknesses for these groups are presented in Table 2-1 (modified from Langley, 1999 and Nordstrom, 1982). The Grayson Marl and Mainstreet Limestone formations (undivided) comprise the upper Washita Group sediments that underlay the Woodbine Formation in the vicinity of the landfill.

According to the Texas Bureau of Economic Geology (BEG), the site is located upon an outcrop of the Woodbine Formation as shown on Figure IIIG-A-1 (Regional Geologic Map) (adapted from the BEG Geologic Atlas of Texas, Dallas Sheet, 1987) and Figure IIIG-A-3 (Regional Geologic Cross Sections) (adapted from Nordstrom, 1982). The underlying Washita Group (Grayson Marl/Mainstreet Limestone) outcrops approximately 8 miles southwest of the site at closest extent. The contact between the Woodbine and overlying Eagle Ford Formation occurs immediately south and southeast of the site permit boundary (BEG, 1987). Regional cross sections indicate that the Cretaceous system forms a southeastward-thickening wedge extending into the East Texas Basin structural feature. Outcrops of Cretaceous geologic formations generally strike north-northeastward in a

monoclinal structure that dips to the east-southeast at rates ranging from 15 to 70 feet per mile (Nordstrom, 1982).

Table 2-1
Regional Stratigraphy in the Vicinity of the Turkey Creek Landfill

Period	Series	Group or Formation	Approximate Formation Depth and (Thickness) in feet	Lithologic Characteristics and Depositional Environment
Quaternary	Holocene	Alluvium	At Surface (about 1'-33' in Site Area)	Clay, silt, sand, and gravel deposited in fluvial environments.
	Pleistocene	Terrace	At Surface (0'-50' Regionally)	Clay, silt, sand, and gravel deposited in fluvial environments.
Cretaceous	Gulfian	Austin Chalk	Outcrops East of Site (0'-700' Regionally)	Chalk, limestone, marl and occasional sand deposited in marine environments.
		Eagle Ford	Outcrops South and East of Site (150'-280' thick Regionally)	Shale with some thin platy beds of siltstone and sandy limestone deposited in marine environments.
		Woodbine	At Surface (200' thick beneath Site)	Sand, sandstone, clay, shale, and lignite deposited in fluvial and marine deltaic environments.
	Comanchian	Washita Group	200' below landfill (300' thick)	Limestone, marl, and clay; some sand near top deposited in marine environment.
		Fredericksburg Group	500' below landfill (200' thick)	Limestone, clay, marl, shale, and shell agglomerates deposited in near shore marine environments.
		Trinity Group	700' below landfill (1,000 feet thick)	Fine sand, sandy shale, and shale deposited in fluvial, deltaic, and near shore marine environments.
Paleozoic	undifferentiated		1,700' below landfill	Sandstone, limestone, shale, and conglomerate.

Modified from Langley (1999) and Nordstrom (1982).

2.3 Geologic Processes

2.3.1 Fault and Seismic Data

Seismic impact zone and fault investigations are discussed in the location restrictions in Parts I/II, Appendix I/IIC. As discussed in these sections, no geologic processes, including active faults or seismic impact zones, are located within 1 mile of the site.

2.3.2 Erosional Processes

Erosional processes in the landfill area are limited to those produced by the Turkey Creek drainage system which include rill and channel erosion and sheet flow. Erosion from natural drainage processes is minimal in the vicinity if the site. No adverse effects from natural erosional processes are anticipated and no mass wasting has been observed.

2.3.3 Wetlands Identification

Details regarding jurisdictional wetland areas are provided in the location restriction demonstrations in Appendix I/IIC.

2.4 Regional Aquifers

Regional aquifers beneath the landfill include the Cretaceous-age Woodbine and Trinity aquifers. These aquifers are separated by approximately 500 feet of low permeability Washita and Fredericksburg group sediments. According to Hardin, et al. (2004), the Woodbine and Trinity aquifers are not hydraulically interconnected. The Woodbine Aquifer is situated stratigraphically above the underlying Trinity Aquifer. The Paluxy, Glen Rose, and underlying Twin Mountain formations comprise the Trinity Aquifer system.

2.4.1 Woodbine Aquifer

The TWDB classifies the Woodbine Aquifer as a minor Texas aquifer (Ashworth and Hopkins, 1995) composed predominately of fine-grained, cross-stratified, fluvial sand interbedded with shale, clay, and some gravel (Hopkins, 1996 and Harden, et al., 2004). Woodbine sediments were deposited by fluvial, destructive deltaic, and strand plain depositional systems sourced from erosion of the Ouachita uplift in Oklahoma and Arkansas (BEG, 1971 and Harden, et al., 2004). The Woodbine Formation ranges in thickness from less than 100 feet in south Texas to over 600 feet in down-dip areas of northeast Texas (Harden, et al., 2004). According to Nordstrom (1982) and local water well logs, the Woodbine Formation is approximately 200 to 280 feet thick in the vicinity of Turkey Creek Landfill.

According to Harden, et al. (2004), Woodbine groundwater is present under confined conditions throughout most of north Texas but may be unconfined in areas of outcrop. Local water well logs indicate a Woodbine Aquifer groundwater potentiometric surface elevation of about 600 ft-msl in the vicinity of the site. This is consistent with the regional potentiometric contours illustrated in Figure IIIG-A-4 (Regional Woodbine Aquifer Potentiometric Surface Map). The regional Woodbine Aquifer groundwater flow direction follows the regional dip of the formation, to the east-southeast, with an average rate of groundwater movement reported to be about 10 to 20 feet per year (Nordstrom, 1982). The primary source of recharge to the aquifer is precipitation infiltration on the Woodbine Formation outcrop, upon which the landfill is founded and through Quaternary Alluvium sediments overlaying the Woodbine Formation (where present). The Woodbine Formation outcrop and overlying Quaternary Alluvium areas within 15 miles of the site are shown on Figure IIIG-A-1 (Regional Geologic Map) in Appendix IIIG-A.

Hydraulic properties and groundwater quality in the Woodbine Aquifer is summarized in Table 2-2 (modified from Nordstrom, 1982 and Langley, 1999). According to Nordstrom (1982), the Woodbine Aquifer produces fresh, good quality water from wells completed on or near the outcrop but high iron concentrations in the upper Woodbine may make groundwater undesirable. In general, Woodbine groundwater quality deteriorates rapidly down dip from the outcrop with total dissolved solids, sodium, chloride, and bicarbonate concentrations generally increasing with depth (Nordstrom, 1982).

2.4.2 Trinity Aquifer

The TWDB classifies the Trinity Aquifer as a major Texas aquifer (Ashworth and Hopkins, 1995). From the youngest to oldest, the Trinity Aquifer is comprised of the Paluxy, the Glen Rose, and the Twin Mountain formations. The Paluxy is composed predominately of sand interbedded with clay and shale. Paluxy Formation sediments were derived from the Ouachita and Arbuckle Mountain uplifts in Oklahoma which were deposited in fluvial, deltaic, and strand plain depositional environments (Harden, 2004).

According to the TWDB (Harden, et al., 2004) and local water well logs, the depth to the top of the Trinity Aquifer (top of Paluxy Formation) beneath the landfill is approximately 700 feet below ground surface (near mean sea level) and the depth to the bottom of the Trinity Aquifer (bottom of the Twin Mountains Formation) beneath the landfill is about 1600-1700 ft-bgs (-900 to -1000 ft-msl).

Paluxy groundwater is present under confined conditions throughout most of north Texas but may be unconfined in outcrop areas (Harden, et al., 2004). As illustrated in Figure IIIG-A-5 (Regional Paluxy Aquifer Potentiometric Surface Map), the Paluxy Aquifer groundwater potentiometric surface is about 100-200 ft-msl in the vicinity if the landfill, indicating confined conditions. The Paluxy groundwater flow direction follows the regional dip of the formation to the east with a rate of groundwater movement reported to be less than two feet per year (Nordstrom, 1982). The Paluxy outcrops about 24 miles west of the site (BEG, 1987). The

primary source of recharge to the Paluxy Aquifer is infiltration of precipitation on outcrop.

Hydraulic properties and groundwater quality in the Paluxy Formation is summarized in Table 2-2 (Nordstrom, 1982 and Langley, 1999). According to Langley (1999), Paluxy Aquifer wells produce small to moderate quantities of fresh water. Based on the water quality parameters listed in Table 2-2, Paluxy groundwater is generally of higher quality than Woodbine groundwater.

Table 2-2
Regional Hydraulic Properties and Water Quality Parameters in the Woodbine and Paluxy Aquifers[1]

Hydraulic Properties	Woodbine Aquifer	Paluxy Aquifer
Composition	Sandstone, siltstone, shale	Sandstone, shale
Transmissivity	Average 4,700 gal/day/ft	Range 5,000-10,000 gal/day/ft
Hydraulic Conductivity	Average $2x10^{-3}$ cm/sec	Range $1\text{-}3x10^{-3}$ cm/sec
Flow Rate	10-20 ft/yr	1-2 ft/yr
Recharge Zones	On Outcrop	On outcrop (24 miles west of landfill)
Potentiometric Surface	See Figure IIIG-A-4	See Figure IIIG-A-5
Present Water Use	Public supply, industrial, irrigation, and domestic	Public supply, domestic, and some industrial
Water Wells Within 1 Mile	See Figure IIIG-A-6 and Table 2-3	See Figure IIIG-A-6 and Table 2-3
Water Quality Parameters	**Woodbine Aquifer (76 well average)**	**Paluxy Aquifer (51 well average)**
Total Dissolved Solids (mg/l)	877.39	606.70
Chloride (mg/l Cl)	85.88	36.08
Sodium (mg/l Na)	311.76	187.76
Nitrate (mg/l NO_3)	0.67	1.00
Sulfate (mg/l SO_4)	209.18	101.25
Fluoride (mg/l F)	1.30	1.06

[1]Modified from Langley (1999) and Nordstrom (1982).

2.5 Water Well Search

A search to identify Texas-registered water wells within a 1-mile radius of the landfill permit boundary included a water well search performed by GeoSearch, Inc. (GeoSearch) in September 2021 for records and maps on file in the USGS National Water Information System (NWIS), Texas Submitted Drillers Report Database (SSDRD), TCEQ database, Texas Water Development Board (TWDB) database, and state Water Utility Database (WUD) records. GeoSearch identified 66 water wells within 1 mile of the landfill permit boundary. Weaver Consultants

Group, LLC (WCG) performed an independent water well search which included review of the aforementioned databases, as well as facility records and a field reconnaissance from area roadways, and identified a total of three additional water wells which were not included in the GeoSearch water well findings. Two of these three water wells (32-47-101 and TX11232) were identified in the SSDRD and appear to be located just inside the 1-mile radius boundary. One of these three water wells is the landfill's existing onsite water well which was identified during site reconnaissance and in review of facility records. The GeoSearch well report, supporting SSDRD water well reports, and the onsite water well report are provided in Appendix IIIG-A. The information for the identified water wells within a 1-mile radius of the landfill is summarized in Table 2-3. The water well locations are shown on the Figure IIIG-A-6. Note that the total well depths listed in the Geosearch report for wells TX454936, TX191303, and TX124357 are incorrect. The correct depths were obtained from the individual SSDRD record reports, copies of which are provided in Appendix IIIG-A.

Of the identified water wells, 47 are completed in the Woodbine Aquifer, two are completed in the Upper Trinity Aquifer (Paluxy), and five are completed in the Lower Trinity Aquifer (Twin Mountains), three appear to completed in surficial alluvium sediments, and two are unknown due to lack of available information. The facility's existing onsite water well was installed in 1986, is screened within the regional Woodbine Aquifer at 200 feet of depth, and provides non-potable water for landfill operations.

Table 2-3
Registered Water Wells Within 1 Mile of Turkey Creek Landfill[1]

Well Identification Number	Total Well Depth (ft)	Screened Aquifer[2]	Use
TX414545	180	Woodbine	Domestic
TX62653	220	Woodbine	Rig Supply
TX62654	220	Woodbine	Rig Supply
TX104498	200	Woodbine	Domestic
TX576426	240	Woodbine	Domestic
TX236027	145	Woodbine	Domestic
TX454936	170	Woodbine	Domestic
TX509061	220	Woodbine	Domestic
TX524171	240	Woodbine	Domestic
TX153676	180	Woodbine	Domestic
TX552450	240	Woodbine	Domestic
TX236030	180	Woodbine	Domestic
TX378909	200	Woodbine	Domestic
TX518636	240	Woodbine	Domestic
TX567360	240	Woodbine	Domestic
TX191303	40	Alluvium	Domestic
TX557789	220	Woodbine	Domestic
32-47-108	1660	Lower Trinity (Twin Mountains)	Plugged
1260018	Unknown	Unknown	Active
USGS_32205109 0.370 WSW	1640	Lower Trinity (Twin Mountains)	Unknown
32-47-103	840	Upper Trinity (Paluxy)	Public Supply
TX563724	200	Woodbine	Domestic
TX576910	240	Woodbine	Domestic
TX551091	220	Woodbine	Domestic
TX553611	220	Woodbine	Domestic
TX556034	220	Woodbine	Domestic
TX537968	240	Woodbine	Domestic
TX551092	220	Woodbine	Domestic
TX562061	220	Woodbine	Domestic
TX312903	220	Woodbine	Domestic
TX34165	212	Woodbine	Irrigation
TX537974	240	Woodbine	Domestic
TX542816	240	Woodbine	Domestic
TX562074	220	Woodbine	Domestic
TX542815	240	Woodbine	Domestic

Notes: [1] Water well number, depth and use information obtained from digital water well reports.
[2] Water well aquifer designations based on water well log records and lithologic information.

Table 2-3 (Continued)
Registered Water Wells Within 1 Mile of Turkey Creek Landfill[1]

Well Identification Number	Total Well Depth (ft)	Screened Aquifer[2]	Use
TX556079	220	Woodbine	Domestic
TX562052	220	Woodbine	Domestic
TX562077	220	Woodbine	Domestic
TX562081	220	Woodbine	Domestic
TX557790	220	Woodbine	Domestic
TX542817	240	Woodbine	Domestic
TX542818	240	Woodbine	Domestic
TX556064	220	Woodbine	Domestic
TX553625	220	Woodbine	Domestic
TX556093	220	Woodbine	Domestic
TX523793	240	Woodbine	Domestic
TX236023	225	Woodbine	Domestic
TX556053	220	Woodbine	Domestic
TX551090	220	Woodbine	Domestic
TX560662	30	Alluvium	Domestic
TX236024	267	Woodbine	Irrigation
TX576413	220	Woodbine	Domestic
TX314418	1560	Lower Trinity (Twin Mountains)	Public Supply
TX16107	240	Woodbine	Domestic
TX484678	310	Woodbine	Domestic
TX99726	265	Woodbine	Domestic
1260137	Unknown	Unknown	Inactive - Non-potable
TX526236	69	Alluvium	Domestic
TX67239	220	Woodbine	Rig Supply
32-47-203	245	Woodbine	Domestic
TX67240	220	Woodbine	Rig Supply
TX124357	1209	Lower Trinity (Twin Mountains)	Rig Supply
TX30121	220	Woodbine	Stock
TX236029	170	Woodbine	Domestic
TX236025	160	Woodbine	Domestic
TX236028	262	Woodbine	Domestic
32-47-101	795	Upper Trinity (Paluxy)	Domestic
TX112232	1550	Lower Trinity (Twin Mountains)	Rig Supply
Onsite Water Well	200	Woodbine	Industrial

Notes: [1] Water well number, depth and use information obtained from digital water well reports.
[2] Water well aquifer designations based on water well log records and lithologic information.

2.6 Site Reconnaissance

WCG completed water well reconnaissance from area roadways during multiple site visits from April to September 2021. The purpose of the reconnaissance was to identify potential unregistered water wells within a 1-mile radius of the landfill permit boundary. WCG also searched for the presence of springs and faulting within the immediate accessible area within a 1-mile radius of the landfill permit boundary. The reconnaissance was limited by viewing obstructions, including vegetation and structures, and private property access restrictions. The reconnaissance included visual observations for the presence of elevated water tanks, wellhead equipment, pressure balance tanks, small outlying structures having electrical power drops, and windmills. Based on the reconnaissance field observations, no new water wells, no springs, and no surface expressions of faulting were identified. According to Brune (2002), there are no springs identified in the vicinity of the site and there are no active springs within Johnson County.

3 SUBSURFACE INVESTIGATION REPORT

3.1 Site Stratigraphy

3.1.1 Existing Borehole Data

The existing subsurface characterization of the site is supported by data from 134 previously advanced borings whose locations are shown on Figure IIIG-B-1. The data from these borings is summarized in Table 3-1. The individual lithologic logs are provided in Appendix IIIG-B. The 134 borings were advanced during 20 drilling events conducted between 1981 and 2021and are further discussed in Section 3.3.

To illustrate subsurface conditions, 11 geologic cross sections were constructed from the available lithologic and hydrogeologic data obtained from the site-specific lithologic logs (provided in Appendix IIIG-B), local water well logs (provided in Appendix IIIG-A), and information contained in prior investigatory reports. These cross sections are presented in Appendix IIIG-C as Figures IIIG-C-2 through IIIG-C-11, and Figure IIIG-C-13. Geologic cross section index maps are included as Figures IIIG-C-1 and IIIG-C-12. The groundwater elevation data presented on these cross sections was obtained from available tabulated water level data in previous subsurface investigation reports (for the groundwater piezometers installed prior to 2021), from gauging conducted by WCG (for the piezometers completed in 2021), from the August 2010 sampling event by The Carel Corporation (for the groundwater monitoring wells), and from water well logs (for expanded geologic section F-F'). Monitoring well groundwater elevation data from the August 2010 event was chosen to illustrate in cross section space because it includes data collected within a single gauging event from both the former groundwater monitoring system wells (pre-2009 shallow screened monitoring wells) and the currently approved groundwater monitoring system wells.

The lithologic logs and geologic cross sections indicate that the facility's subsurface geology can be divided into three site-specific stratigraphic units which include (1) the Upper Sand Unit, (2) the Bounding Shale Unit, and (3) the Lower Sand Unit. The nomenclature for these three site-specific stratigraphic units was developed under the facility's existing permit (MSW Permit No. 1417C) for the purpose of consolidating the former unit/layer designations that were used prior to the issuance of permit no. MSW-1417C. No deviations from this permitted subsurface characterization are needed or proposed under this major permit amendment (pursuant to Permit No. MSW-1417D). Each site-specific subsurface stratigraphic unit is further discussed in the subsequent sections.

3.1.2 Upper Sand Unit

At ground surface in undeveloped areas across the site lies the Upper Sand Unit. This site-specific stratigraphic unit is present due to the in-situ weathering of Woodbine Formation sediments and the deposition of alluvial sediments. According to the existing site exploration data, the Upper Sand Unit sediments are composed predominately of sand, clayey sand, sandy clay, clay, and silty clay, with lesser proportions of silty sand and silt, and minor occurrences of sandy gravel. The borehole data also indicate the presence of organics, gypsum, pyrite, lignite, ferrous staining, iron nodules, and calcareous nodules, as well as thin calcareous and sulfate seams and partings. These sediments exhibit a high degree of compositional heterogeneity with interbedding and abrupt sudden to gradational transitions between predominate material composition.

Landfill development has removed the Upper Sand Unit sediments from within the limits of waste. Predevelopment, this unit ranged in thickness from 1.5 to 44 feet, with the thinnest occurrences generally located in the northcentral and southwestern portion of the site areas, and thickest accumulations present in the vicinity of the Class 1 waste disposal area and northernmost permit boundary area. Discontinuities noted within the Upper Sand Unit include fissures identified in boring B-16 (in shallow clay sediments between the elevations of 663 and 667 ft-msl). No fractures, jointing, or slickensides were noted within the Upper Sand Unit sediments in the existing borehole lithologic logs and investigatory reports. The field slug test results for Upper Sand Unit-screened piezometer B-32 indicate a permeability of $3x10^{-4}$ cm/sec (Baker-Shiflett, 1991).

3.1.3 Bounding Shale Unit

Beneath the Upper Sand Unit lies the Bounding Shale Unit. The Bounding Shale Unit is continuous beneath the permit boundary and is comprised of Woodbine Formation sediments. According to the existing site exploration data, the Bounding Shale Unit sediments are composed predominately of sandy shale, clayey shale, and silty shale, commonly interbedded with thin seams and laminations of silt, siltstone, sand, and sandstone. The borehole data also indicate the presence of organics, fossils, gypsum, pyrite, chert nodules, ferrous staining, glauconitic laminations, and thin lignite and limestone seams.

The top of the Bounding Shale Unit occurs at depths as shallow as 1.5 feet in the higher (northcentral and southwestern) portion of the site area were the unit is encountered at elevations above 700 ft-msl. The majority of the landfill bottom, including the entire existing and undeveloped Class 1 disposal areas, is founded in the Bounding Shale Unit. This unit exhibits low permeabilities with values ranging from $4.5x10^{-9}$ to $2.0x10^{-5}$ cm/sec (horizontal) and $1.9x10^{-9}$ to $9.14x10^{-8}$ cm/sec (vertical). The Bounding Shale Unit also exhibits varying degrees of saturation and contains portions of the uppermost aquifer.

Throughout the majority of the site the Bounding Shale Unit sediments are described as dry in the uppermost portion, moist at deeper intervals within the shale, and wet within interbedded coarse-grained seams, laminations, and partings, as well as within the interjecting coarse-grained lenses and seams of the Lower Sand Unit. Throughout the northernmost area of the facility the Bounding Shale Unit composition contains higher proportions of sand, both in matrix and as interbedded seams/laminations, which correspond to an increase in moist and wet intervals in this area.

The existing borehole logs for the site identify slickensides in five borings (MW-11, MW-18, MW-22, MW-23, and MW-26) at elevations ranging from about 616 to 677 ft-msl within the Bounding Shale Unit. The 1981 geotechnical investigation by Baker-Shiflett describes fractures and jointing in two borings (B-5 and B-12) at elevations ranging from about 686 to 692 ft-msl within the Bounding Shale Unit.

3.1.4 Lower Sand Unit

Within the Bounding Shale Unit lies the Lower Sand Unit. The Lower Sand Unit is characterized as discontinuous bodies of coarse-grained sandy sediments bounded by, and interbedded within, the Bounding Shale Unit. Sediments within this unit are associated with the Woodbine Formation and surficial alluvium (where present) composed predominately of sand, sandstone, and silty sand, with lesser proportions of sandy silt, clayey silt, silt, and siltstone, and interbedded clay and shaly clay seams and laminations. The borehole data also indicate the presence of fossils, ferrous staining, ferrous nodules and concretions, chert, and thin lignite partings. The sand bodies within this unit are generally isolated lenticular lenses that coalesce in some areas and otherwise pinch out, or grade into, the sandy shale sediments of the Bounding Shale Unit. The size of individual sand bodies varies significantly with intervals as much as 25 feet thick beneath the site. The Lower Sand Unit sediments are predominately moist to wet and contain the majority of the uppermost aquifer. Field slug test data from piezometers screened within the Lower Sand Unit sediments indicate a permeability range of $2.0x10^{-5}$ to $5.68x10^{-3}$ cm/sec.

3.1.5 Woodbine Aquifer Zone

Beneath the upper sediments of the site-specific Upper Sand Unit, Bounding Shale Unit, and Lower Sand Units lies the Woodbine Aquifer Zone. The depth of this zone is known from the local water well logs presented in Appendix IIIG-A. An expanded geologic cross section F-F' was produced as Figure IIIG-C-13 in Appendix IIIG-C and presents the lithologic and water level information of nine facility's Subtitle D groundwater monitoring wells, the facility's onsite water well, and four neighboring offsite water wells. The Woodbine Aquifer Zone consists of a sequence of coarse-grained saturated sediments that characterize the basal portions of the greater Woodbine Formation which constitute the regional Woodbine Aquifer in the vicinity of the site. According to local water well logs, this unit is comprised predominately of sand with lesser amounts of shale and limestone. Local Woodbine water wells in

the site vicinity are screened within this basal Woodbine Aquifer Zone and exhibit confined aquifer conditions with potentiometric surface elevations consistent with those published by the TWDB for the regional Woodbine Aquifer. The facility's onsite water well is screened in the Woodbine Aquifer Zone with a filter pack interval extending from 491 to 531 ft-msl.

As shown on Figure IIIG-C-13, there is about 60 feet of vertical separation between the potentiometric surfaces of the perched uppermost aquifer and underlying Woodbine Aquifer which indicate that the two are not hydraulically connected. Groundwater within the uppermost aquifer is conveyed by sediments of the Lower Sand Unit interconnected by seams and laminations of coarse-grained Bounding Shale Unit sediments. The perched condition of the uppermost aquifer results from the low vertical permeability of the Bounding Shale Unit. The lower Bounding Shale Unit sediments form an aquitard and Lower Confining Unit to the perched groundwater of the overlying uppermost aquifer by impeding downward vertical migration of groundwater in favor of the contrastingly higher horizontal permeability of interbedded coarse grained upper Bounding Shale Unit and Lower Sand Unit sediments.

3.2 Soil Boring Plan

The currently approved subsurface characterization (TCEQ Permit No. MSW-1417C) utilized 122 soil borings to characterize the approximately 150-acre permit boundary area with a permitted elevation of deepest excavation (EDE) of 648.4 ft-msl. Title 30 TAC §330.63(e)(4)(B) requires that 23 boreholes be advanced to a minimum of 5 feet below the EDE, of which 13 be advanced to a minimum of 30 feet below the EDE for the characterization of a 150-acre area. The previously advanced 122 borings include 29 borings advanced to depths exceeding 5 feet below the EDE; of which 15 were advanced to depths exceeding 30 feet below the EDE. The number and depths of the existing (previously drilled) borings exceed the regulatory requirements of Title 30 TAC §330.63(e)(4)(B) for the existing permit boundary footprint of approximately 150-acre area.

The 2021 Soil Boring Plan proposed the advancement of 12 additional geotechnical borings and piezometer installations within eight of the 12 geotechnical borings. The geologic and hydrogeological data and information from the 122 previously advanced borings and the additional 12 borings and eight piezometers installed in 2021 were utilized to assess subsurface conditions within the proposed lateral expansion areas and beneath the facility as a whole pursuant to the development of this Major Permit Amendment (for Permit No. MSW-1417D).

On March 10,2021 the facility submitted a Soil Boring Plan to TCEQ pursuant to the proposed TCEQ Permit No. MSW-1417D landfill expansion. Excerpts from the 2021 Soil Boring Plan are presented in Appendix IIIG-E. The TCEQ Soil Boring Plan approval letter (dated April 8, 2021) is also presented in Appendix IIIG-E.

3.3 Previous Site Exploration Summary

A summary of site explorations is provided in this section. Information regarding the borings completed at the site are summarized in Table 3-1. The boring logs are presented in Appendix IIIG-B. The borehole locations and original ground surface elevations are shown on Figure IIIG-B-1. Based on a review of the previous permit applications, geotechnical reports, and lithologic logs, it is our understanding that all previous soil borings were conducted in accordance with established field exploration methods in accordance with Title 30 TAC §330.63(e)(4)(c); with the exception of the boring log lithologic descriptions by Baker-Shiflett which do not indicate moisture content or groundwater encountered at time of drilling.

- A 1981 subsurface investigation by Baker-Shiflett included 15 geotechnical borings (B-1 through B-15) that were drilled to evaluate subsurface conditions beneath the original 91-acre site.

- A 1983 drilling project by Baker-Shiflett included the installation of five groundwater monitor wells (MW-1 through MW-5). No lithologic logs or well data sheets are available for these monitor wells.
- A 1984 subsurface investigation by Baker-Shiflett included four geotechnical borings (S-1 through S-4) that were drilled to further evaluate subsurface conditions of the original 91-acre site.
- A 1986 subsurface investigation by Baker-Shiflett included 15 geotechnical borings (B-16 through B-30) that were drilled to investigate deeper subsurface conditions beneath the original 91-acre site.
- A 1987 subsurface investigation by Baker-Shiflett included seven exploratory borings (A-1 through A-7) that were drilled along the southern extent of the original 91-acre site to further characterize subsurface conditions and provide additional groundwater data. Temporary groundwater piezometers were installed in four of the borings (A-4 through A-7). However, no details of their construction are available.
- A 1988-1989 subsurface investigation by Baker-Shiflett included 14 exploratory borings (B-31 through B-44) that were drilled to characterize subsurface conditions beneath the southern approximately 135-acre property pursuant to expanding the site to the currently permitted 226-acre area under MSW-Permit No. 1417B. Temporary groundwater piezometers were installed in 13 of the borings (B-31 through B-43).
- A 1990 drilling project by Baker-Shiflett included the installation of two groundwater monitor wells (MW-2B and MW-3B).
- A 1991 subsurface investigation by Baker-Shiflett included four exploratory borings (B-9A, 32A, 36A, and 44A) that were completed as temporary groundwater piezometers to further characterize groundwater within the Upper Sand unit.
- A 1992-1993 drilling project by EMCON included the installation of 14 groundwater monitoring wells (MW-1C, MW-4B, MW-5B, and MW-6 through MW-16).
- A 1994 drilling project by CURA included the installation of three landfill gas probes (GMP-1 through GMP-3).
- A 1994 drilling project by Golder Associates included the installation of 11 landfill gas probes (GMP-4 through GMP-13 and GMP-5A).
- A 1995 drilling project by EMCON included the installation of nine groundwater monitoring wells (MW-17 through MW-23, MW-26, and MW-27).
- A 1999 drilling project by EMCON included the installation of two groundwater monitoring wells (MW-24 and MW-25).

- A 2001 drilling project by Weaver Boos and Gordon included the installation of landfill gas probe GMP-10A.
- A 2002 drilling project by The Carel Corporation included the installation of two landfill gas probes (GMP-7A and GMP-13A).
- A 2004 subsurface investigation project by Weaver Boos Consultants included the installation of temporary landfill gas monitoring probe TMP-5B.
- A 2009 drilling project by The Carel Corporation included the installation of six groundwater monitoring wells (MW-28 through MW-33).
- A 2012 subsurface investigation by The Carel Corporation included six exploratory borings (B9-1, B9-2, B10-1, B10-2, B11-1, and B12-1) that were drilled to further characterize subsurface conditions in the southeast undeveloped area pursuant to a Limited Scope Permit Amendment for the acceptance of Class 1 waste (Sectors 9-11).
- A 2013 drilling project by The Carel Corporation included the installation of landfill gas probe GMP-9A.
- A 2021 subsurface investigation by Weaver Consultants Group included the advancement of 12 geotechnical borings (PWCG-1, PWCG-2, PWCG-3, PWCG-4, WCG-5, WCG-6, WCG-7, WCG-8, PWCG-9, PWCG-10, PWCG-11, and PWCG-12). Groundwater piezometers were installed in eight of these 12 borings (PWCG-1, PWCG-2, PWCG-3, PWCG-4, PWCG-9, PWCG-10, PWCG-11, and PWCG-12). These borings and piezometers were drilled and installed to further characterize subsurface conditions within the western and eastern lateral expansion areas pursuant to this Major Permit Amendment for Permit No. MSW-1417D.

Table 3-1
Summary of Existing Boring Depths and Elevations

Boring I.D.	Surface Elevation (ft-msl)	Northing	Easting	Total Depth (ft)	Bottom Elevation (ft-msl)	Bottom Depth Above or (Below) EDE[1] (ft)	Tally of Borings 5 Feet or Greater Below EDE	Tally of Borings 30 Feet or Greater Below EDE
1981 Borings by Baker-Shiflett								
B-1	684.2	6815239.61	2370246.92	35.0	649.2	0.8		
B-2	679.3	6815738.79	2370133.25	25.0	654.3	5.9		
B-3	680.8	6815505.45	2369955.45	35.0	645.8	(2.6)		
B-4	684.8	6815032.96	2369826.39	40.0	644.8	(3.6)		
B-5	697.0	6815653.69	2369483.99	30.0	667.0	18.6		
B-6	687.5	6815225.78	2369472.06	13.0	674.5	26.1		
B-7	698.2	6815388.83	2369066.87	40.0	658.2	9.8		
B-8	702.7	6814664.64	2369281.08	35.0	667.7	19.3		
B-9	702.5	6815193.07	2368888.19	24.0	678.5	30.1		
B-10	692.9	6814764.21	2368890.09	40.0	652.9	4.5		
B-11	707.4	6814299.11	2368596.44	25.0	682.4	34.0		
B-12	706.8	6814806.60	2368541.84	40.0	666.8	18.4		
B-13	714.2	6814353.32	2368331.63	35.0	679.2	30.8		
B-14	669.1	6816307.56	2369408.78	11.5	657.6	9.2		
B-15	678.0	6815424.85	2368345.38	7.5	670.5	22.1		
1983 Borings by Baker-Shiflett								
MW-1	NA	6815152.17	2370392.09	20.0	NA	NA		
MW-2	NA	6814863.47	2369992.34	30.0	NA	NA		
MW-3	NA	6815159.52	2368530.18	40.0	NA	NA		
MW-4	NA	6815856.50	2370127.99	30.0	NA	NA		
MW-5	NA	6814228.89	2368370.94	20.0	NA	NA		
1984 Borings by Baker-Shiflett								
S-1	700.0	6814290.59	2368611.04	50.0	650.0	1.6		
S-2	697.0	6814920.95	2368969.70	70.0	627.0	(21.4)	1	
S-3	690.0	6815366.63	2369490.48	70.0	620.0	(28.4)	2	
S-4	681.0	6815397.44	2369904.62	70.0	611.0	(37.4)	3	1
1986 Borings by Baker-Shiflett								
B-16	672.0	6814753.19	2368084.76	50.0	622.0	(26.4)	4	
B-17	665.0	6815712.54	2368408.69	50.0	615.0	(33.4)	5	2
B-18	666.0	6815268.89	2368100.48	60.0	606.0	(42.4)	6	3
B-19	669.0	6815087.17	2367829.37	50.0	619.0	(29.4)	7	
B-20	667.0	6815859.04	2368855.80	50.0	617.0	(31.4)	8	4
B-21	669.0	6816079.32	2369606.68	50.0	619.0	(29.4)	9	
B-22	704.0	6813018.76	2369210.17	35.5	668.5	20.1		
B-23	708.0	6813736.46	2368660.94	30.0	678.0	29.6		
B-24	710.0	6813572.06	2368277.77	27.5	682.5	34.1		
B-25	697.0	6813223.90	2367573.39	25.0	672.0	23.6		
B-26	716.0	6812739.10	2368162.32	23.0	693.0	44.6		
B-27	708.0	6812803.72	2368681.95	29.5	678.5	30.1		
B-28	704.0	6813360.49	2368903.32	21.0	683.0	34.6		
B-29	731.0	6812395.50	2367672.94	25.0	706.0	57.6		
B-30	700.0	6812772.50	2367198.77	20.0	680.0	31.6		
1987 Borings by Baker-Shiflett								
A-1	720.0	6814118.43	2368365.21	23.0	697.0	48.6		
A-2	722.0	6814222.98	2368506.74	21.5	700.5	52.1		
A-3	716.0	6814326.00	2368617.16	21.5	694.5	46.1		
A-4	709.0	6814441.46	2368844.69	23.0	686.0	37.6		
A-5	707.0	6814558.72	2369046.41	23.0	684.0	35.6		
A-6	680.0	6814644.64	2369199.83	12.0	668.0	19.6		
A-7	708.0	6814731.32	2369352.40	28.0	680.0	31.6		
1987 Borings by Baker-Shiflett								
B-31	715.2	6812854.01	2367630.47	40.0	675.2	26.8		
B-32	701.5	6812881.24	2369441.21	32.0	669.5	21.1		
B-33	710.1	6813403.99	2370551.40	50.5	659.6	11.2		
B-34	702.8	6813532.91	2369848.47	43.0	659.8	11.4		
B-35	685.0	6813959.98	2369781.41	40.0	645.0	(3.4)		
B-36	706.0	6814095.66	2369171.41	57.0	649.0	0.6		
B-37	697.9	6813578.05	2369581.94	36.0	661.9	13.5		
B-38	710.2	6813112.39	2368333.06	50.0	660.2	11.8		
B-39	697.4	6814440.74	2369752.30	60.0	637.4	(11.0)	10	
B-40	707.0	6813783.18	2369127.62	60.0	647.0	(1.4)		
B-41	705.3	6813149.70	2368916.10	60.0	645.3	(3.1)		
B-42	695.5	6813706.38	2367977.38	40.0	655.5	7.1		
B-43	711.4	6812757.87	2368446.81	60.0	651.4	3.0		
B-44	673.0	6814611.77	2370334.02	18.0	655.0	6.6		
1990 Borings by Baker-Shiflett								
MW-2B	669.5	6815337.39	2367838.27	32.5	637.0	(11.4)	11	
MW-3B	654.1	6816338.19	2369609.42	24.0	630.1	(18.3)	12	

[1] The permitted EDE for the facility is 648.4 ft-msl.
NA = No available data.

Table 3-1 (Continued)
Summary of Existing Boring Depths and Elevations

Boring I.D.	Surface Elevation (ft-msl)	Northing	Easting	Total Depth (ft)	Bottom Elevation (ft-msl)	Bottom Depth Above or (Below) EDE[1] (ft)	Tally of Borings 5 Feet or Greater Below EDE	Tally of Borings 30 Feet or Greater Below EDE
1991 Borings by Baker-Shiflett								
B-9A	714.2	6815110.80	2368552.45	100.0	614.2	(34.2)	13	5
B-32A	702.0	6812881.24	2369441.21	92.0	610.0	(38.4)	14	6
B-36A	705.9	6814095.66	2369171.41	85.0	620.9	(27.5)	15	
B-44A	670.2	6814611.77	2370334.02	65.0	605.2	(43.2)	16	7
1992/1993 Borings by EMCON								
MW-1C	685.8	6815197.87	2370140.31	15.0	670.8	22.4		
MW-4B	678.0	6815870.01	2370129.43	60.0	618.0	(30.4)	17	8
MW-5B	716.0	6812659.52	2368293.87	18.5	697.5	49.1		
MW-6	708.4	6812923.76	2368865.96	20.0	688.4	40.0		
MW-7	708.4	6812922.02	2368864.72	69.0	639.4	(9.0)	18	
MW-8	698.9	6813035.79	2369339.16	19.0	679.9	31.5		
MW-9	699.1	6813075.57	2369386.29	74.0	625.1	(23.3)	19	
MW-10	692.4	6813699.61	2369575.63	20.0	672.4	24.0		
MW-11	691.2	6813738.96	2369588.67	54.0	637.2	(11.2)	20	
MW-12	682.6	6814079.63	2369892.20	16.0	666.6	18.2		
MW-13	682.8	6814101.71	2369908.55	48.0	634.8	(13.6)	21	
MW-14	674.4	6814691.89	2370453.33	20.0	654.4	6.0		
MW-15	674.0	6814740.07	2370461.79	69.0	605.0	(43.4)	22	9
MW-16	685.9	6813619.98	2367855.26	33.0	652.9	4.5		
1994 Borings by CURA, Inc.								
GMP-1	695.2	6814715.16	2367602.81	35.0	660.2	11.8		
GMP-2	677.3	6815187.89	2367752.80	25.0	652.3	3.9		
GMP-3	688.1	6814463.87	2367517.02	15.0	673.1	24.7		
1994 Borings by Golder & Associates, Inc.								
GMP-4	701.8	6813715.99	2367280.67	25.0	676.8	28.4		
GMP-5	717.9	6812734.50	2367290.57	30.0	687.9	39.5		
GMP-5A	710.0	6812517.32	2367239.38	30.0	680.0	31.6		
GMP-6	716.8	6812495.28	2368160.56	10.0	706.8	58.4		
GMP-7	708.2	6812893.19	2368761.13	10.0	698.2	49.8		
GMP-8	704.2	6812917.95	2369601.03	20.0	684.2	35.8		
GMP-9	703.8	6813574.41	2370006.30	25.0	678.8	30.4		
GMP-10	670.8	6814550.56	2370590.56	10.0	660.8	12.4		
GMP-11	681.3	6815167.09	2370431.29	15.0	666.3	17.9		
GMP-12	673.6	6815884.27	2370191.49	20.0	653.6	5.2		
GMP-13	656.2	6816286.30	2369681.58	10.0	646.2	(2.2)		
1995 Borings by EMCON								
MW-17	727.3	6813389.15	2367256.18	23.5	703.8	55.4		
MW-18	686.3	6813938.18	2367555.81	34.0	652.3	3.9		
MW-19	671.4	6815282.85	2367805.24	43.5	627.9	(20.5)	23	
MW-20	658.6	6815638.95	2368218.76	19.0	639.6	(8.8)	24	
MW-21	658.7	6815645.31	2368231.48	45.0	613.7	(34.7)	25	10
MW-22	669.9	6815781.56	2368468.57	29.5	640.4	(8.0)	26	
MW-23	669.9	6815786.01	2368479.51	54.0	615.9	(32.5)	27	11
MW-26	654.4	6816324.73	2369640.24	43.0	611.4	(37.0)	28	12
MW-27	686.4	6815204.56	2370131.67	87.0	599.4	(49.0)	29	13
1999 Borings by EMCON								
MW-24	659.3	6816139.68	2369018.45	25.6	633.7	(14.7)	30	
MW-25	659.1	6816146.55	2369033.39	51.8	607.3	(41.1)	31	14
2001 Boring by Weaver Boos & Gordon								
GMP-10A	696.5	6814184.69	2370497.75	44.0	652.5	4.1		
2002 Borings by The Carel Corporation								
GMP-7A	709.4	6812854.89	2368800.83	45.0	664.4	16.0		
GMP-13A	646.9	6816412.32	2369543.29	10.0	636.9	(11.5)	32	
2004 Boring by Weaver Boos Consultants								
TMP-5B	717.9	6812725.47	2367303.03	39.8	678.1	29.7		
2009 Borings by The Carel Corporation								
MW-28	658.9	6815911.30	2368678.66	35.0	623.9	(24.6)	33	
MW-29	659.2	6816196.70	2369170.44	36.5	622.7	(25.7)	34	
MW-30	662.7	6816139.34	2369957.95	42.0	620.7	(27.7)	35	
MW-31	688.4	6815590.63	2370014.13	65.0	623.4	(25.0)	36	
MW-32	695.3	6814466.92	2370203.61	70.0	625.3	(23.1)	37	
MW-33	693.4	6813628.99	2369587.28	65.0	628.4	(20.0)	38	
2012 Borings by The Carel Corporation								
B9-1	683.2	6814168.43	2368889.53	45.0	638.2	(10.2)	39	
B9-2	679.7	6813753.83	2369151.13	45.0	634.7	(13.7)	40	
B10-1	717.1	6814445.18	2369167.43	90.0	627.1	(21.3)	41	
B10-2	709.9	6814055.23	2369445.36	75.0	634.9	(13.5)	42	
B11-1	714.7	6814407.08	2369607.07	95.0	619.7	(28.7)	43	
B12-1	690.9	6814702.63	2369914.28	80.0	610.9	(37.5)	44	15
2012 Boring by The Carel Corporation								
GMP-9A	704.1	6813551.12	2370019.17	36.0	668.1	19.7		

[1] The permitted EDE for the facility is 648.4 ft-msl.
NA = No available data.

Table 3-1 (Continued)
Summary of Existing Boring Depths and Elevations

Boring I.D.	Surface Elevation (ft-msl)	Northing	Easting	Total Depth (ft)	Bottom Elevation (ft-msl)	Bottom Depth Above or (Below) EDE[1] (ft)	Tally of Borings 5 Feet or Greater Below EDE	Tally of Borings 30 Feet or Greater Below EDE
2021 Borings by Weaver Consultants Group								
PWCG-1	673.85	6815354.23	2367733.98	60.0	613.85	(34.55)	45	16
PWCG-2	694.26	6814739.20	2367642.31	85.0	609.26	(39.14)	46	17
PWCG-3	689.63	6814236.20	2367438.65	60.0	629.63	(18.77)	47	
PWCG-4	704.65	6813684.57	2367265.44	65.0	639.65	(8.75)	48	
WCG-5	687.03	6813716.14	2367579.86	70.0	617.03	(31.37)	49	18
WCG-6	696.23	6814069.05	2370148.66	55.0	641.23	(7.17)	50	
WCG-7	703.59	6813714.33	2369874.87	63.0	640.59	(7.81)	51	
WCG-8	702.37	6813304.46	2369673.60	60.0	642.37	(6.03)	52	
PWCG-9	697.06	6814149.29	2370537.73	85.0	612.06	(36.34)	53	19
PWCG-10	701.74	6813712.91	2370113.15	90.0	611.74	(36.66)	54	20
PWCG-11	707.22	6813240.98	2369833.06	95.0	612.22	(36.18)	55	21
PWCG-12	705.12	6812843.77	2369563.48	90.0	615.12	(33.28)	56	22

[1] The permitted EDE for the facility is 648.4 ft-msl.
NA = No available data.

4 GROUNDWATER INVESTIGATION REPORT

4.1 Water Level Measurements

Groundwater at the facility has been evaluated using historical water-level data from the facility's former piezometers, former groundwater monitoring wells, existing groundwater monitoring wells, and eight piezometers installed in 2021. Groundwater elevations from the currently approved Subtitle D groundwater monitoring wells are provided in Table 4-1 and were measured during monitoring events dating back to November of 1995. These data were obtained from the facility's Subtitle D groundwater database which maintained by The Carel Corporation. In addition, Weaver Consultants Group began conducting water level readings from the facility's existing groundwater monitoring wells and eight newly installed piezometers in September 2021, which are summarized in Table 4-2. Groundwater potentiometric surface contour maps prepared from the March and September 2021 water level data are presented as Figures IIIG-D-1 and IIIG-D-2 in Appendix IIG-D. These groundwater contour maps indicate a groundwater flow regime that consistent with those depicted historically for the facility. Historical groundwater flow regime and groundwater monitoring system design is further discussed in Appendix IIIH of the SDP.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations

Date	MW-1C	MW-2B	MW-3B	MW-4B	MW-5B	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17
11/6/1995	676.3	653.82	640.86	641.45	709.89	701.8	688.82	693.24	656.58	682.81	655.34	674.52	650.41	667.5	643.88	668.48	715.32
2/12/1996	NM	653.82	639.58	641.82	710.59	702.32	655.1	693.55	655.7	684.84	654.57	675.43	650.59	667.69	645.04	665.3	714.98
5/16/1996	677.28	652.62	639.2	641.61	709.97	701.52	654.72	692.89	655.26	684.84	654.18	675.57	650.47	667.92	644.49	663.7	714.59
8/21/1996	676.94	651.85	636.9	NM	707.77	699.16	654.04	691.4	654.24	680.3	653.02	672.25	649.73	666.28	642.01	662.64	713.5
11/13/1996	678	652.26	637.81	640.63	709.53	700.62	653.8	693.2	654.44	680.8	653.26	672.43	649.77	668.81	643.67	663.96	713.5
3/5/1997	679.7	655.98	643.62	645.59	711.83	706.66	653.9	695.7	655.18	687.18	654.32	677.65	649.89	670.38	646.35	666.45	716.84
6/16/1997	NM	NM	NM	NM	711.12	702.85	655.15	693.74	656.66	687.74	655.58	678.13	650.3	NM	NM	668.95	716.44
6/17/1997	677.65	656.24	641.62	644.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	669.22	645.71	NM	NM
9/15/1997	NM	NM	NM	NM	708.04	699.55	654.98	691.47	656.18	681.81	654.96	673.9	650.32	NM	NM	668.07	714.36
9/16/1997	677.38	652.67	637.83	641.06	NM	NM	NM	NM	NM	NM	NM	NM	NM	668.27	643.67	NM	NM
3/4/1998	679.2	657.05	643.55	646.08	713.48	706.47	NM	695.59	657.24	688.64	656.18	678.64	651.06	669.96	646.63	669.68	715.9
9/23/1998	675.82	651.62	636.84	639.16	707.63	699.02	655.17	691.92	656.18	679.32	654.83	671.69	650.61	667.37	643.1	666.83	713.66
3/5/1999	678.16	656.21	642.06	644.09	711.78	704.22	655.06	694.87	657.17	685.24	656.01	673.96	650.91	667.3	646.15	669.55	715.75
4/28/1999	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/9/1999	676.42	651.96	639.36	639.8	707.1	698.64	655.35	691.08	655.68	678.96	655.34	670.85	650.85	664.99	642.53	667.97	713.16
11/18/1999	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2000	677.36	651.63	637.65	639.94	708.58	700.17	655.32	693.51	655.03	680.13	653.86	671.24	650.75	665.58	644.88	663.7	712.27
6/29/2000	679.19	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NM	643.21	NM	NM
8/15/2000	677.73	651.49	637.07	640.08	707.01	699	655.6	690.88	656	679.25	654.8	670.18	652.3	665.55	647.1	668.13	712.13
11/20/2000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/3/2001	679.99	657.39	643.65	646.51	713.66	706.52	656.48	695.89	657.54	691.07	656.61	674.18	651.05	658.76	647.1	670.43	716.5
6/26/2001	NM	NA	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/8/2001	677.47	653.28	638.9	641.46	708.34	699.77	655.69	691.34	657.3	684.4	656.24	674.69	650.62	666.82	644.01	669.32	714.02
2/20/2002	676.44	656.34	641.15	643.29	710.6	704.02	656.44	694.63	656.72	689.5	656.09	674.04	645.64	668.95	645.22	669.89	713.35
4/11/2002	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/8/2002	673.3	650.82	636.43	676.5	708.56	700.67	656.73	691.93	657.64	687.3	656.55	669.44	651.25	668.51	644.8	669.93	713.91
10/1/2002	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	650.98	667.24	NM	NM	NM
1/28/2003	676.83	654.88	638.97	641.95	705.55	702.08	656.55	694.12	657	688.1	655.62	669.86	650.85	669.5	644.91	668.59	712.01
3/26/2003	NA	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NM	NM	NM
8/4/2003	677.22	655.01	637.78	641.23	705	699.42	656.69	691.16	657.31	685.01	655.86	669.45	651.15	667.98	642.92	669.37	711.16
9/10/2003	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/10/2004	677.1	656.24	639.24	641.99	704.56	698.99	656.46	594.19	657.37	687	655.97	669.43	650.89	670.66	644.99	669.8	710.86
5/21/2004	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	649.94	NM	NM	NM	NM
8/9/2004	677.03	655.24	637.69	641.09	704.85	693.96	655.51	690.02	657.16	684.37	655.35	669.06	651.36	667.68	642.52	668.67	710.16
10/29/2004	NM	NM	640.31	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/21/2005	678.32	658.83	643.89	646.75	705.72	695.61	657.65	594.74	659.91	686.18	657.04	669.63	652.09	670.12	646.8	671.23	711.95
4/28/2005	677.63	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/27/2005	676.05	653.47	637.96	640.06	704.47	693.5	657.3	688.76	656.28	682.79	654.52	668.2	650.53	666.23	637.54	667.9	711.09
1/6/2006	NM	NM	637.51	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/28/2006	NM	652.26	NM	NM	704.21	693.1	656.42	NM	NM	NM	NM	NM	NM	NM	NM	NM	710.25
3/1/2006	676.31	NM	638.12	639.09	NM	NM	NM	689.35	654.77	682.69	653.83	668.7	650.29	667.47	640.29	664.78	NM

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations (continued)

Date	MW-1C	MW-2B	MW-3B	MW-4B	MW-5B	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17
8/8/2006	676.82	651.56	637.66	638.79	703.68	692.87	656.8	688.3	653.23	681.13	654.24	668.27	650.12	666.42	638.54	665.68	709.75
10/17/2006	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	667.25	NM	NM	NM
1/29/2007	677.79	657.56	639.64	641.49	704.4	693.33	656.8	689.63	656.8	683.8	653.97	668.79	650.1	673.3	641.14	669.32	709.09
4/4/2007	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/19/2007	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	669.55	650.1	NM	NM	NM	NM
5/21/2007	678.86	657.08	642.37	644.45	704.21	693.97	657.69	689.57	657.3	684.38	655.91	669.36	650.81	669.37	640.98	669.42	709.66
8/6/2007	678.35	658.97	643.53	646.05	705.15	694.62	657.75	690.09	657.6	685.12	655.91	651.09	650.92	670.04	641.39	669.88	710.43
10/25/2007	NM	NM	641.59	NM	NM	NM	NM	NM	NM	NM	NM	669.2	NM	668.97	NM	669.57	NM
2/4/2008	677.24	656.92	642.35	644.4	704.15	693.3	657.89	689.36	657.19	682.14	655.67	669.2	651.16	669.93	640.74	668.19	709.81
6/23/2008	NM	NM	641.33	NM	NM	NM	NM	NM	657.65	NM	NM	NM	NM	NM	NM	NM	NM
8/4/2008	677.24	655.18	639.78	641.83	703.74	693.2	657.71	688.43	657.27	645.04	655.4	668.37	650.82	667.49	639.22	668.82	709.5
10/17/2008	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	639.51	NM	NM
2/2/2009	675.82	652.37	638.22	640.21	703.38	692.68	656.86	689.24	655.9	679.6	654.01	668.25	650.2	667.3	639.99	665.69	708.83
4/16/2009	NM	NM	639.07	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
8/25/2009	677.04	651.45	637.96	639.79	702.94	692.47	657.01	687.86	656.07	679.57	653.98	668.06	650.02	667.23	638.46	666.99	708.13
11/25/2009	NM	NM	NM	NM	NM	694.43	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2/9/2010	678.75	660.02	644.71	647.52	704.99	694.38	657.62	691.23	658.3	679.91	654.24	670.6	650.99	667.68	644.29	671.9	709.95
3/4/2010	NM	660.22	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	670.56	NM
5/24/2010	NM	659.37	642.74	NM	704.75	NM	658.57	NM	659.01	NM	NM	670.16	651.72	NM	643.94	670.78	710.81
8/9/2010	677.2	656.7	639.4	643.33	704.46	693.94	658.86	689.09	658.88	683.02	656.63	669.51	651.65	667.41	642.69	670.19	710.61
11/1/2010	NA	NA	640.36	NA	704.2	NA	658.75	NA	658.83	NM	NA	NA	651.35	NA	643.46	670.51	710.28
11/18/2010	NA	NA	640.1	NA	NM	NA	NM	NA	NM	681.76	NA	NA	NM	NA	NM	NM	NM
2/5/2011	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
2/14/2011	NA	NA	642.4	NA	703.75	NA	658.35	NA	658.74	NA	NA	NA	651.35	NA	643.89	669.87	709.53
5/6/2011	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
8/9/2011	NA	NA	638.83	NA	703.24	NA	658.23	NA	657.57	NA	NA	NA	651.13	NA	640.19	665.34	708.9
1/30/2012	NA	NA	641.45	NA	703.52	NA	656.92	NA	656.87	NA	NA	NA	651.44	NA	643.24	667.17	708.19
4/19/2012	NA	NA	643.122	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
8/14/2012	NA	NA	638.932	NA	702.84	NA	657.88	NA	657.8	NA	NA	NA	650.95	NA	640.88	666.19	708.65
11/8/2012	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
2/11/2013	NA	NA	638.06	NA	702.51	NA	656.66	NA	656.17	NA	NA	NA	650.31	NA	641.61	663.35	707.62
5/1/2013	NA	NA	NM	NA	NM	NA	NM	NA	656.75	NA	NA	NA	NM	NA	NM	NM	NM
8/5/2013	NA	NA	638.64	NA	702.41	NA	657.25	NA	657.19	NA	NA	NA	650.98	NA	640.05	666.52	NM
10/3/2013	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	664.49	NM
3/11/2014	NA	NA	639.32	NA	702.84	NA	657.57	NA	657.57	NA	NA	NA	650.72	NA	642.7	667.58	707.18
6/19/2014	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	668.22	NM
8/18/2014	NA	NA	638.45	NA	701.89	NA	657.85	NA	658.1	NA	NA	NA	651.04	NA	640.72	667.95	706.85
12/8/2014	NA	NA	637.55	NA	NM	NA	NM	NA	NM	NA	NA	NA	650.2	NA	NM	667.21	706.64
3/24/2015	NA	NA	639.9	NA	702.55	NA	656.94	NA	657.09	NA	NA	NA	650.7	NA	643.08	666.17	706.94

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations (continued)

Date	MW-1C	MW-2B	MW-3B	MW-4B	MW-5B	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17
6/22/2015	NA	NA	644.38	NA	704.19	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	669.09	NM
9/14/2015	NA	NA	639.93	NA	703.29	NA	657.74	NA	658.36	NA	NA	NA	650.78	NA	641.60	667.69	709.04
3/21/2016	NA	NA	644.77	NA	705.25	NA	658.53	NA	660	NA	NA	NA	651.10	NA	645.46	671.17	710.73
6/9/2016	NA	NA	NM	NA	705.76	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	672.15	NM
9/12/2016	NA	NA	641.25	NA	704.35	NA	659.35	NA	659.96	NA	NA	NA	651.67	NA	642.46	670.19	710.85
12/15/2016	NA	NA	NM	NA	704.08	NA	NM	NA	NM	NA	NA	NA	NM	NA	643.12	NM	NM
3/27/2017	NA	NA	643.15	NA	704.77	NA	659.42	NA	660.49	NA	NA	NA	651.86	NA	644.35	671.39	711.71
6/14/2017	NA	NA	644.15	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
9/25/2017	NA	NA	640.23	NA	703.86	NA	659.64	NA	659.87	NA	NA	NA	651.81	NA	641.5	669.74	710.39
12/13/2017	NA	NA	NM	NA	703.84	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	666.99	NM
3/22/2018	NA	NA	641.55	NA	703.19	NA	657.73	NA	659.09	NA	NA	NA	649.62	NA	641.53	668.06	708.61
9/11/2018	NA	NA	645.79	NA	703.64	NA	659.24	NA	659.28	NA	NA	NA	652.70	NA	642.28	670.03	708.98
12/19/2018	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	672.05	NM
3/12/2019	NA	NA	NM	NA	705.77	NA	660.61	NA	661.03	NA	NA	NA	NM	NA	NM	672.02	711.64
4/2/2019	NA	NA	644.05	NA	NM	NA	NM	NA	NM	NA	NA	NA	652.93	NA	645.1	NM	NM
7/1/2019	NA	NA	NM	NA	707.06	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
9/11/2019	NA	NA	641.09	NA	705.07	NA	660.71	NA	660.78	NA	NA	NA	652.8	NA	644.89	670.66	711.54
12/18/2019	NA	NA	NM	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	710.79
3/23/2020	NA	NA	645.35	NA	708.53	NA	660.36	NA	660.86	NA	NA	NA	652.91	NA	645.29	671.67	711.29
8/11/2020	NA	NA	641.54	NA	705.27	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	711.24
9/15/2020	NA	NA	641.04	NA	705.12	NA	660.4	NA	660.58	NA	NA	NA	652.71	NA	643.41	669.13	711.02
12/16/2020	NA	NA	640.61	NA	NM	NA	NM	NA	NM	NA	NA	NA	NM	NA	NM	NM	NM
3/16/2021	NA	NA	640.71	NA	NA	NA	660.7	NA	660.44	NA	NA	NA	652.38	NA	643.55	NA	710.34

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations (continued)

Date	MW-18	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25	MW-26	MW-27	MW-28	MW-29	MW-30	MW-31	MW-32	MW-33
11/6/1995	670.41	649.31	645.54	645.51	645.01	641.89	NA	NA	637.96	639.57	NA	NA	NA	NA	NA	NA
2/12/1996	666.46	649.44	646.15	645.88	645.95	642.75	NA	NA	638.13	639.72	NA	NA	NA	NA	NA	NA
5/16/1996	664.84	649.11	646.13	645.68	645.58	642.94	NA	NA	637.88	639.51	NA	NA	NA	NA	NA	NA
8/21/1996	662.7	647.36	644.01	643.14	644.19	639.92	NA	NA	635.68	638.35	NA	NA	NA	NA	NA	NA
11/13/1996	667.4	647.7	644.17	644.09	644.57	640.96	NA	NA	636.55	638.7	NA	NA	NA	NA	NA	NA
3/5/1997	670.03	652.56	651.18	651.5	649.31	646.68	NA	NA	639.73	640.11	NA	NA	NA	NA	NA	NA
6/16/1997	672.73	NM	NM	NM	NM	NM	NA	NA	NM	NM	NA	NA	NA	NA	NA	NA
6/17/1997	NM	652.13	648.92	648.48	647.59	645.13	NA	NA	639.63	640.49	NA	NA	NA	NA	NA	NA
9/15/1997	670.9	NM	NM	NM	NM	NM	NA	NA	NM	NM	NA	NA	NA	NA	NA	NA
9/16/1997	NM	648.62	645.27	644.25	644.69	640.94	NA	NA	637.43	639.15	NA	NA	NA	NA	NA	NA
3/4/1998	673.87	652.98	650.8	648.58	648.65	646.34	NA	NA	639.25	642.19	NA	NA	NA	NA	NA	NA
9/23/1998	668.95	647.43	643.6	642.76	644.34	638.95	NA	NA	636.19	639.24	NA	NA	NA	NA	NA	NA
3/5/1999	673.51	651.45	648.54	648.58	647.69	645.25	NA	NA	639.25	640.4	NA	NA	NA	NA	NA	NA
4/28/1999	NM	NM	NM	NM	NM	NM	643.74	654.17	NM	NM	NA	NA	NA	NA	NA	NA
9/9/1999	670.25	647.8	644.62	643.08	644.55	639.7	638.66	647.83	636.36	638.97	NA	NA	NA	NA	NA	NA
11/18/1999	NM	NM	NM	NM	NM	NM	638.28	636.26	NM	NM	NA	NA	NA	NA	NA	NA
3/14/2000	665.93	647.99	644.7	644.1	644.89	640.17	638.95	637.69	635.14	638.51	NA	NA	NA	NA	NA	NA
6/29/2000	NM	NM	NM	NM	NM	NM	642.06	640.74	635.09	NM	NA	NA	NA	NA	NA	NA
8/15/2000	671.69	647.56	644.51	643.2	644.44	640.25	638.92	637.69	634.56	638.4	NA	NA	NA	NA	NA	NA
11/20/2000	NM	NM	643.41	NM	NM	NM	638.28	636.1	634.21	NM	NA	NA	NA	NA	NA	NA
4/3/2001	674.48	654.62	652.28	652.67	649.89	647.91	646.04	645.2	638.81	640.61	NA	NA	NA	NA	NA	NA
6/26/2001	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
8/8/2001	672.42	649.81	646.73	645.64	645.98	642.51	640.55	639.41	640.76	638.56	NA	NA	NA	NA	NA	NA
2/20/2002	673.94	NM	648.92	649.13	647.7	645.55	644.15	643.2	638.13	640	NA	NA	NA	NA	NA	NA
4/11/2002	NM	NM	651.87	NM	NM	NM	NM	NM	640.05	NM	NA	NA	NA	NA	NA	NA
8/8/2002	673.34	NM	643.73	643.64	642.89	640.4	638.07	637.72	635.1	637.21	NA	NA	NA	NA	NA	NA
10/1/2002	NM	NM	645.19	NM	NM	NM	NM	NM	638.47	NM	NA	NA	NA	NA	NA	NA
1/28/2003	672.35	649.69	646.78	646.26	646.42	642.77	641.34	640.74	640.83	640.3	NA	NA	NA	NA	NA	NA
3/26/2003	NM	NM	NA	NM	NM	NM	NM	NM	NA	NM	NA	NA	NA	NA	NA	NA
8/4/2003	672.51	649.81	645.82	664.62	645.2	641.51	639.84	639.84	639.76	640.67	NA	NA	NA	NA	NA	NA
9/10/2003	NM	NM	645.54	NM	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
2/10/2004	673.59	652.8	648.68	648.77	647.11	644.16	642.26	642.24	639.72	640.81	NA	NA	NA	NA	NA	NA
5/21/2004	NM	NM	NM	NM	NM	NM	NM	NM	641.62	NM	NA	NA	NA	NA	NA	NA
8/9/2004	672.7	649.68	645.74	644.53	644.87	641.3	639.71	639.25	639.51	640.8	NA	NA	NA	NA	NA	NA
10/29/2004	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
2/21/2005	674.86	654.88	652.63	652.1	650.14	648.2	645.35	645.27	642.47	641.38	NA	NA	NA	NA	NA	NA
4/28/2005	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
9/27/2005	669.72	648.37	644.83	643.97	645	640.98	639.57	638.81	638.4	640.26	NA	NA	NA	NA	NA	NA
1/6/2006	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
2/28/2006	666.75	648.27	644.76	644.22	NM	NM	NM	NM	NM	NM	NA	NA	NA	NA	NA	NA
3/1/2006	NM	NM	NM	NM	645.27	640.61	639.67	638.83	636.57	637.99	NA	NA	NA	NA	NA	NA

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations (continued)

Date	MW-18	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25	MW-26	MW-27	MW-28	MW-29	MW-30	MW-31	MW-32	MW-33
8/8/2006	669.43	647.28	644.05	642.82	644.42	639.62	638.65	637.43	635.06	634.26	NA	NA	NA	NA	NA	NA
1/29/2007	673.49	652.86	650.32	650.08	648.12	644.72	643.45	643.17	637.01	638.59	NA	NA	NA	NA	NA	NA
4/4/2007	NM	NM	NM	NM	NM	NM	NM	NM	639.32	NM	NA	NA	NA	NA	NA	NA
5/21/2007	672.77	652.84	650.54	650.08	649.44	646.68	644.69	NM	639.11	639.88	NA	NA	NA	NA	NA	NA
8/6/2007	674.75	654.3	651.65	651.48	649.81	647.36	645.32	644.87	640.67	640.49	NA	NA	NA	NA	NA	NA
10/25/2007	NM	NM	NM	NM	NM	NM	NM	NM	640.32	NM	NA	NA	NA	NA	NA	NA
2/4/2008	670.73	651.89	648.98	648.86	648.34	646.1	644.39	644.12	340.46	639.92	NA	NA	NA	NA	NA	NA
8/4/2008	671.96	649.23	646.14	645.26	645.93	642.54	640.91	640.34	624.46	639.71	NA	NA	NA	NA	NA	NA
10/17/2008	NM	NM	NM	643.9	NM	NM	NM	638.94	NM	NM	NA	NA	NA	NA	NA	NA
2/2/2009	666.96	648.27	644.7	644.58	644.9	646.1	639.82	639.15	636.81	638.53	NA	NA	NA	NA	NA	NA
8/25/2009	669.58	647.35	643.92	642.72	644.42	638.41	638.9	637.42	635.41	638	NA	NA	NA	NA	NA	NA
2/9/2010	675.08	656.09	653	653.43	651.23	648.22	644.82	642.19	645.41	641.56	646.71	644.29	646.18	648.48	652.94	657.39
3/4/2010	675.74	NM	NM	NM	NM	NM	645.98	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/24/2010	675.45	654.65	650.61	650.38	NM	NM	NM	NM	640.28	642.58	644.97	643.1	642.93	646.68	653.14	657.83
8/9/2010	674.59	650.96	647.64	646.67	646.95	643.52	641.77	641.07	639.07	640.71	641.96	640.37	640.2	645.14	652.45	657.39
11/1/2010	675.48	651.15	648.07	647.74	NA	NA	NA	NM	640.27	641.45	643.52	642.3	641.98	645.67	652.45	657.38
11/18/2010	NM	NM	NM	647.63	NA	NA	NA	642.74	NM	NM	NM	NM	NM	NM	NM	NM
2/14/2011	674.53	652.02	649.08	649.04	NA	NA	NA	NA	640.62	641.5	644.85	643.13	642.86	646.06	652.37	656.99
5/6/2011	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	644.33	642.73	665.63	645.71	652.49	696.52
8/9/2011	667.51	648.17	645.13	643.9	NA	NA	NA	NA	637.74	640.13	639.65	638.61	637.41	643.06	650.76	655.57
1/30/2012	673.53	652.28	649.85	649.68	NA	NA	NA	NA	640.62	640.12	645.04	643.33	642.07	644.41	650.78	655.2
4/19/2012	NM	NM	651.12	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM
8/14/2012	669.13	648.02	645.05	643.5	NA	NA	NA	NA	637.53	639.76	638.92	638.27	637.67	643.38	650.84	655.74
11/8/2012	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	654.37
2/11/2013	668.23	647.7	644.19	643.8	NA	NA	NA	NA	636.47	638.81	639.31	638.07	636.84	662.3	669.39	667.73
8/5/2013	671.36	647.72	644.71	643.68	NA	NA	NA	NA	636.64	639.57	639.57	638.49	637.34	662.8	650.17	654.96
10/3/2013	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	649.76	NM
3/11/2014	673.1	649.38	646.62	645.69	NA	NA	NA	NA	636.4	639.96	641.31	639.39	637.88	643.18	650.82	655.54
6/19/2014	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	651.13	NM
8/18/2014	672.76	648.53	645.59	644.59	NA	NA	NA	NA	636.17	NM	640.01	638.16	637.08	642.9	650.9	656.09
12/8/2014	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	636.02	NM	NM	NM
3/24/2015	672.92	649.91	649.4	648.69	NA	NA	NA	NA	636.3	639.82	643.72	640.87	641.31	644.17	650.66	655.01
6/22/2015	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	644.89	NM	NM	NM	NM
9/14/2015	672.89	649.47	645.98	645.22	NA	NA	NA	NA	637.71	638.18	641.18	639.74	638.86	643.85	650.83	656.26
3/21/2016	676.51	657.32	652.96	653.68	NA	NA	NA	NA	641.54	543.06	646.86	645.27	646.13	648.24	657.86	657.44
9/12/2016	675	651.4	647.53	646.88	NA	NA	NA	NA	639.64	642.74	642.35	640.6	640.36	645.43	652.85	657.78
12/15/2016	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	652.66	NM
3/27/2017	677.02	654.52	651.26	651.12	NA	NA	NA	NA	641.07	643.53	645.91	643.74	643.24	646.91	653.42	658.56

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-1
Subtitle D Monitoring Event Groundwater Elevations (continued)

Date	MW-18	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25	MW-26	MW-27	MW-28	MW-29	MW-30	MW-31	MW-32	MW-33
6/14/2017	NM	NM	NM	649.94	NA	NA	NA	NA	NM	643.91	NM	NM	643.15	NM	NM	NM
9/25/2017	674.11	649.81	645.94	645.24	NA	NA	NA	NA	638.93	640.86	640.9	645.94	638.87	645.49	652.33	657.68
3/22/2018	672.48	652.42	649.78	649.36	NA	NA	NA	NA	638.93	641.96	644.96	642.59	641.95	645.67	650.57	647.01
9/11/2018	676.13	649.92	646.88	645.8	NA	NA	NA	NA	638.05	642.18	641.4	639.59	639.31	643.95	651.86	647.9
12/19/2018	NM	NM	NM	652.79	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM
3/12/2019	677.23	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	657.37
4/2/2019	NM	656.69	652.16	652.36	NA	NA	NA	NA	641.37	644.48	646.17	643.77	644.18	647.96	654.53	NM
7/1/2019	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	643.72	NM	NM	NM	NM
9/11/2019	676.18	651.66	647.22	646.83	NA	NA	NA	NA	641.08	643.09	641.76	639.27	639.93	646.63	653.29	658.58
12/18/2019	NM	NM	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM
3/23/2020	677.19	656.88	653.87	653.92	NA	NA	NA	NA	641.12	644.25	648.54	646.17	647.47	649.05	654.46	659.24
8/11/2020	NM	NM	NM	652.5	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM
9/15/2020	675.61	NM	653.5	647.04	NA	NA	NA	NA	639.12	643.52	647.82	645.92	641.19	645.91	653.49	658.63
12/16/2020	675.51	651.9	NM	NM	NA	NA	NA	NA	NM	NM	NM	NM	NM	NM	NM	NM
3/16/2021	675.41	652.88	648.89	648.7	NA	NA	NA	NA	639.98	643.67	644.29	643.03	641.99	646.49	653.38	658.59

Notes: Groundwater elevations listed in feet above mean sea level.
NM = Not Measured.
NA = Not Applicable; well not installed or plugged.

Table 4-2
2021 Landfill Expansion Groundwater Elevations

Well or Piezometer	September 15, 2021 Gauging Event	October 26, 2021 Gaugin Event
MW-3B	640.14	640.58
MW-5B	705.36	NA
MW-7	660.72	660.81
MW-9	660.61	660.08
MW-13	653.71	653.61
MW-15	642.86	642.99
MW-16	669.84	NA
MW-17	711.54	711.08
MW-18	674.01	673.44
MW-19	651.34	650.40
MW-20	646.82	646.06
MW-21	646.18	640.51
MW-26	639.44	639.86
MW-27	643.66	643.48
MW-28	641.42	641.22
MW-29	639.65	639.79
MW-30	639.82	639.64
MW-31	645.50	645.13
MW-32	653.25	653.05
MW-33	658.32	657.83
PWCG-1	651.37	654.22
PWCG-2	663.81	663.06
PWCG-3	669.89	668.97
PWCG-4	673.58	673.01
PWCG-9	643.34	643.43
PWCG-10	652.52	653.81
PWCG-11	657.05	656.71
PWCG-12	658.40	658.06

Notes: Groundwater elevations listed in feet above mean sea level.
NA = Not Applicable; well plugged prior to gauging event.

4.2 Permeability of the Uppermost Aquifer

Hydraulic conductivity tests performed during subsurface investigations prior to 2021 include nine vertical and seven horizontal laboratory permeability tests performed on Bounding Shale Unit samples, field slug tests performed on four piezometers screened in Lower Sand Unit sediments, and field infiltration tests performed on three piezometers screened in Bounding Shale Unit sediments. The geotechnical laboratory reports and information pertaining to the performed permeability testing are provided in Appendix IIIE (Geotechnical Report). The permeability results are summarized in Table 4-3.

Laboratory vertical permeability testing was performed on Bounding Shale Unit soil core samples from expansion borings WCG-6, WCG-7, WCG-8, and PWCG-10 in September 2021. In addition, Weaver Consultants Group performed rising-head slug testing on the facility's eight 2021-installed groundwater piezometers (PWCG-1, PWCG-2, PWCG-3, PWCG-4, PWG-9, PWCG-10, PWCG-11, and PWCG-12) which are screened within Lower Sand Unit sediments in November 2021. The 2021 permeability and slug testing results are summarized in Table 4-3.

The Bounding Shale Unit testing data exhibit arithmetic mean permeability values of 2.63×10^{-8} cm/sec (K_v) and 3.6×10^{-6} cm/sec (K_h) and maximum permeability values of 9.14×10^{-8} cm/sec (K_v) and 2.0×10^{-5} cm/sec (K_h). This range of contrasting horizontal-to-vertical permeability values are reasonable given the sedimentary composition and structure of the Bounding Shale Unit sediments and accounts for the perched condition of the uppermost aquifer.

These slug tests results indicate Lower Sand Unit hydraulic conductivity values of 1.10×10^{-3} cm/sec (arithmetic mean K_h) and 5.68×10^{-3} cm/sec (maximum K_h). This range of hydraulic conductivity values is characteristic of sandstone, fine sand, and silty sediments (Driscoll, 1986).

Table 4-3
Summary of Hydraulic Conductivity Results*

Boring	Test Interval (ft-bgs)	K (cm/sec)
Upper Sand Unit - Slug Test Results (K_h)		
B-32	12.0 - 22.5	$3.00x10^{-4}$
Lower Sand Unit - Slug Test Results (K_h)		
B-36A	66.0 - 71.0	$2.10x10^{-5}$
B-42	30.0 - 40.0	$2.00x10^{-5}$
B-44A	57.0 - 62.0	$1.00x10^{-4}$
PWCG-1	30.3 - 40.3	$5.40x10^{-3}$
PWCG-2	37.8 - 47.6	$5.68x10^{-3}$
PWCG-3	30.9 - 40.9	$1.42x10^{-4}$
PWCG-4	35.4 - 45.4	$4.16x10^{-4}$
PWCG-9	56.4 - 66.4	$1.20x10^{-4}$
PWCG-10	50.8 - 70.8	$9.97x10^{-5}$
PWCG-11	60.8 - 75.8	$7.72x10^{-5}$
PWCG-12	64.2 - 79.2	$7.72x10^{-5}$
Lower Sand K_h Arithmetic Mean:		$1.10x10^{-3}$
Bounding Shale Unit – K_v Laboratory Test Results		
B-5	9.0 - 10.5	$5.60x10^{-8}$
B9-1	11.0 - 12.0	$1.40x10^{-8}$
B9-2	12.0 - 13.0	$5.70x10^{-9}$
B10-1	58.5 - 60.0	$7.80x10^{-8}$
B10-1	65.0 - 66.0	$1.90x10^{-9}$
B10-2	50.0 - 52.0	$3.00x10^{-8}$
B11-1	55.0 - 57.0	$1.10x10^{-8}$
B11-1	65.0 - 66.0	$2.20x10^{-9}$
B12-1	35.0 - 36.0	$7.90x10^{-9}$
WCG-6	38.0 - 40.0	2.95x10-8
WCG-7	40.0 - 42.0	1.36x10-8
WCG-8	26.0 - 28.0	9.14x10-8
WCG-8	40.0 - 42.0	1.46x10-8
PWCG-10	80.0 - 82.0	1.20x10-8
Bounding Shale K_v Arithmetic Mean:		$2.63x10^{-8}$
Bounding Shale Unit – K_h Laboratory Test Results		
B-1	15.0 - 16.5	$3.80x10^{-8}$
B-2	4.5 - 5.5	$2.70x10^{-7}$
B-5	9.0 - 10.5	$5.90x10^{-6}$
B-8	20.0 – 21.0	$7.30x10^{-7}$
B-9	5.0 - 5.75	$4.50x10^{-9}$
B-10	4.0 - 5.0	$5.30x10^{-8}$
B-12	15.0 - 15.5	$2.00x10^{-7}$
Bounding Shale Unit – Field Infiltration Test Results (K^h)		
B-9	8.5 – 24.0	$2x10^{-5}$
B-10	5.0 – 15.0	$2.5x10^{-6}$
B-13	5.0 – 35.0	$6.4x10^{-6}$
Bounding Shale K_h Arithmetic Mean:		$3.6x10^{-6}$

* Refer to Appendix IIIE-C for geotechnical laboratory reports.
K_h = Horizontal hydraulic conductivity value.
K_v = Vertical hydraulic conductivity value.

The site-wide hydraulic gradient was approximated from the September 2021 groundwater contour map in Appendix IIIG-D (Figure IIIG-D-2) at 0.0011 ft/ft. An effective porosity has been conservatively estimated at 10 percent for the uppermost aquifer (after Driscoll, 1989). The following groundwater linear flow velocity calculation uses a hydraulic gradient of 0.0011 ft/ft, a maximum Upper Sand Unit horizontal hydraulic conductivity (K_h) value of $5.68x10^{-3}$ cm/s, and a conservative effective porosity (n_e) of 0.10. The formula for the velocity calculation is:

$$V = K_h * i * 1{,}034{,}646 / n_e$$

Where:

V = linear velocity
K_h = hydraulic conductivity (cm/sec)
i = hydraulic gradient (ft/ft)
1,034,646 = scalar to convert from cm/sec to ft/year
n_e = effective porosity

Using these conservative values, the maximum horizontal groundwater linear velocity in the uppermost aquifer is estimated at 64.6 ft/yr.

4.3 Hydrogeologic Interpretation

Groundwater at the site is perched within alluvial and upper Woodbine Formation sediments of the Upper Sand, Lower Sand, and Bounding Shale units.

4.3.1 Uppermost Aquifer

The first continuous groundwater zone encountered beneath the landfill unit occurs within the Lower Sand unit and the interconnecting saturated portions of the Bounding Shale unit which collectively constitute the site-wide uppermost aquifer. Groundwater in the uppermost aquifer is transmitted within interconnected Lower Sand unit sand lenses and interbedded sand and silt seams within the Bounding Shale unit. Fracture discontinuities (fractures, fissures, jointing, and slickensides) may also provide groundwater flow pathways within the clay and shale sediments of the uppermost aquifer. However, the predominance of these features have only been identified at relatively shallow intervals in the western/northern areas between borings MW-18 and MW-26. The only fracture discontinuity identified outside of this general northern area is a zone of slickensides described in the lithologic log of boring MW-11 within the interval of 655.7 to 691.2 ft-msl.

The hydrogeologic data from former Upper Sand/Lower Sand screened monitoring well pairs across the site indicate that the Upper Sand and Lower Sand unit sediments are hydraulically separated across most of the facility area and are hydraulically interconnected along the northern permit boundary. Groundwater in the uppermost aquifer exhibits confined conditions across the majority of the site area with unconfined conditions evident in the areas along the northern permit boundary. The

transition from confined to unconfined conditions is influenced by, and results from: (1) the convergence of Upper Sand and Lower Sand unit sediments, (2) an overall increase in the proportion of sand and silt within the Bounding Shale sediments both in matrix and as interbedded seams and laminations, (3) the presence of shallow fracture discontinuities (fractures, jointing, fissures, and slickensides) identified at shallow intervals in northern facility area borings, and (4) the abrupt elevation change along the northernmost facility areas near the margin of Turkey Creek's floodway.

4.3.2 Lower Confining Unit

The low vertical hydraulic conductivity of the Bounding Shale Unit (arithmetic mean K_v of $2.63x10^{-8}$ cm/sec) and contrasting higher horizontal conductivity of the Lower Sand unit (arithmetic mean K_h of $1.10x10^{-3}$ cm/sec) and Bounding Shale Unit (arithmetic mean K_h of $3.6x10^{-6}$ cm/sec) indicate a directional permeability differential of 2 to 3 orders of magnitude between sediments of the uppermost aquifer and the confining shale sediments. Under these conditions, perched groundwater flows horizontally within the confining low permeability sediments of the Bounding Shale Unit and downgradient toward Turkey Creek and the northernmost areas of the site. Evidence of this confined perched condition is also indicated by approximately 60 feet of potentiometric head separation between the uppermost aquifer and the regional Woodbine Aquifer as illustrated in the expanded cross section on Figure IIIG-C-13.

4.3.3 Groundwater Monitoring System

The existing groundwater monitoring system design includes 13 point of compliance (POC) monitoring wells screened within Lower Sand and Bounding Shale unit sediments of the uppermost aquifer. Two additional existing POC monitoring wells (MW-3B and MW-20) are screened at shallower depths within the Upper Sand Unit (spanning the Upper Sand and Bounding Shale unit contact). These two Upper Sand wells are located strategically near the lowest point of the landfill unit (MW-3B) and the lowest point immediately downgradient of the pre-Subtitle D fill area (MW-20). The current groundwater monitoring system utilizes two background monitoring wells located hydraulically upgradient of the landfill unit (MW-17 and MW-18). The proposed groundwater monitoring system network buildout is illustrated on Figure IIIH-A-1 in Appendix IIH of the SDP and includes 18 POC monitoring wells and two background monitoring wells. The groundwater monitoring system design is further discussed in the Groundwater Sampling and Analysis Plan provided in Appendix IIIH of the SDP.

4.4 Class 1 Waste Disposal Area Location Restrictions

The site's permitted Class 1 Waste disposal areas are shown on Figure IIIG-D-4 and include Sectors 9 through 11. The Class 1 waste disposal area was permitted in 2012 following TCEQ-acceptance of the Limited Scope Permit Amendment application (LSPA) by Geosyntec Consultants. This LSPA included a subsurface characterization performed by The Carel Corporation in 2012 to assess hydrogeologic conditions beneath the then-proposed Class 1 waste disposal footprint pursuant to the location restrictions defined in Title 30 TAC §335.584(b)(1 and 2), which was made a part of the site's existing permit (MSN-1417B) as Attachment 11E. A complete copy of the 2012 Subsurface Characterization report (obtained from Permit No. MSW-1417B) is provided in Appendix IIIG-D. The 2012 investigation included six geotechnical borings (B9-1, B9-2, B10-1, B10-2, B11-1, and B12-1) advanced to assess the composition, saturation, and permeability of soils beneath the Class 1 waste disposal footprint. The results of this investigation were documented in

Attachment 11E which was made part of the Site Development Plan (SDP) for permit No. MSW-1417B with TCEQ approval of the 2012 LSPA. The Class 1 subsurface investigation data were reviewed in 2019/2020 by Weaver Consultants Group to reassess compliance pursuant to the major amendment permit application (for permit number MSW-1417C).

Pursuant to this major permit amendment (Permit No. MSW-1417D), the subsurface investigation data for the proposed eastern lateral expansion area proposed for Class 1 waste acceptance (future Sector 12) were reviewed to assess compliance with applicable Class 1 waste disposal unit location restrictions and the findings are discussed in the following sections.

4.4.1 Compliance with 30 TAC §335.584(b)(1)

This location restriction requires a minimum of five feet of $1x10^{-5}$ cm/sec or lower permeability material between the bottom and sides of a Class 1 containment structure. The Class 1 disposal footprint is founded in low permeability Bounding Shale Unit sediments. The laboratory permeability results for the Bounding Shale Unit samples beneath the existing permitted Class 1 waste disposal areas (Sector 9 through Sector 11) and the proposed Class 1 lateral expansion waste disposal area (Sector 12) indicate arithmetic mean and maximum vertical hydraulic conductivity values of $2.63x10^{-8}$ cm/sec and $914x10^{-8}$ cm/sec; respectively.

Upper Sand Unit sediments are present surficially within the undeveloped Class 1 disposal areas (Sector 11 and Sector 12) and will be excavated through during future cell construction. Where Upper Sand Unit sediments exhibiting a hydraulic conductivity of $1x10^{-5}$ cm/sec or higher are encountered above the Bounding Shale Unit within the Class 1 waste area, the facility will over-excavate the Upper Sand Unit sediments and construct a recompacted clay plug separation barrier beneath the liner. The clay plug separation barrier specifications are provided in Appendix IIIA of the SDP.

4.4.2 Compliance with 30 TAC §335.584(b)(2)

This location restriction requires a minimum of 10 feet of $1x10^{-7}$ cm/sec or lower permeability material between the bottom of the Class 1 containment structure and any underlying regional aquifer. As discussed in the previously, the Class 1 disposal footprint areas are founded in competent Bounding Shale Unit sediments of the Woodbine Formation with a maximum vertical hydraulic conductivity of $914x10^{-8}$ cm/sec.

The term 'regional aquifer' is defined in Title 30 TAC §335.581(1) as 'Any aquifer defined as a major or minor aquifer by the Texas Water Development Board.' As discussed in Section 2.4, the TWBD classifies the Woodbine Aquifer as a minor Texas aquifer (Ashworth and Hopkins, 1995). The regional Woodbine Aquifer potentiometric surface contours published by the TWBD are presented on Figure

IIIG-A-4 in Appendix IIIG-A and indicate that the regional Woodbine Aquifer potentiometric surface beneath the site occurs at an elevation of approximately 600 ft-msl. As discussed in Section 3.1.5 and presented on Figure IIIG-C-13 (Expanded Geologic Cross Section F-F'), the local water well log data indicate a regional Woodbine Aquifer potentiometric surface beneath the site consistent with those published by the TWBD.

The lowest excavation point within the Class 1 waste disposal area occurs at the Sector 9 Sump at an elevation of about 650 ft-msl. The Sector 9 sump is about 680 feet from the facility's onsite water well which is screened in the regional Woodbine Aquifer. The static Woodbine Aquifer groundwater elevation in the onsite water well is reported at 580 ft-msl. Therefore, the vertical separation between the lowermost Class 1 excavation and the top of the regional Woodbine Aquifer can be estimated at approximately 70 feet.

In addition to the separation demonstrated between the Class 1 waste excavation and regional Woodbine Aquifer, the site geologic data indicate a vertical separation greater than 10 feet between the Class 1 waste excavation and the uppermost aquifer. A hydrostratigraphic structural contour of the uppermost aquifer and permitted excavation grades for the Class 1 disposal area is provided on Figure IIIG-D-4. This hydrostratigraphic surface was constructed using the uppermost saturated or sandy sediments identified within the Bounding Shale unit. As shown on Figure IIIG-D-1, the vertical separation between the Class 1 excavation grades and the top of uppermost aquifer exceeds 10 feet throughout the entirety of the permitted Class 1 disposal footprint area.

4.5 Contaminant Pathways

In the unlikely occurrence of a release of leachate from the landfill unit, the most probable pathway for the migration of pollutants will occur vertically through the vadose zone and laterally into the saturated Bounding Shale and Lower Sand unit sediments of the uppermost aquifer. Once within the uppermost aquifer, pollutants would be transported within the uppermost aquifer and down gradient in the direction of groundwater flow toward the permitted Point of Compliance and network of existing groundwater detection monitoring wells.

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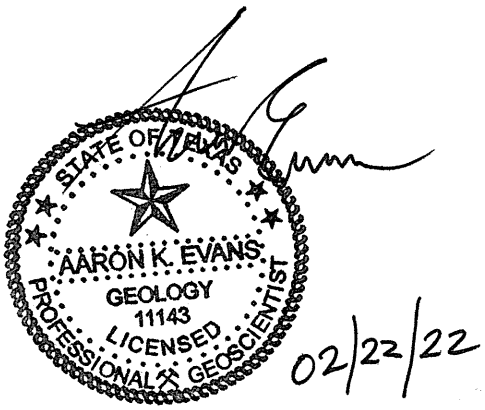
APPENDIX IIIG-A

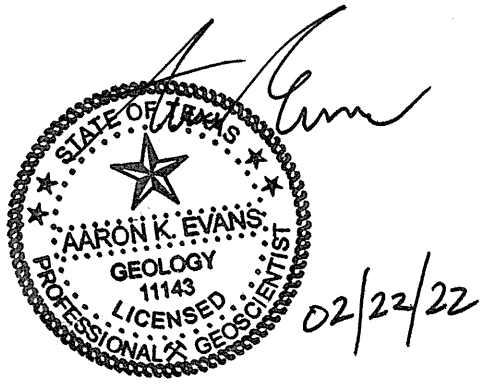
REGIONAL GEOLOGIC DATA

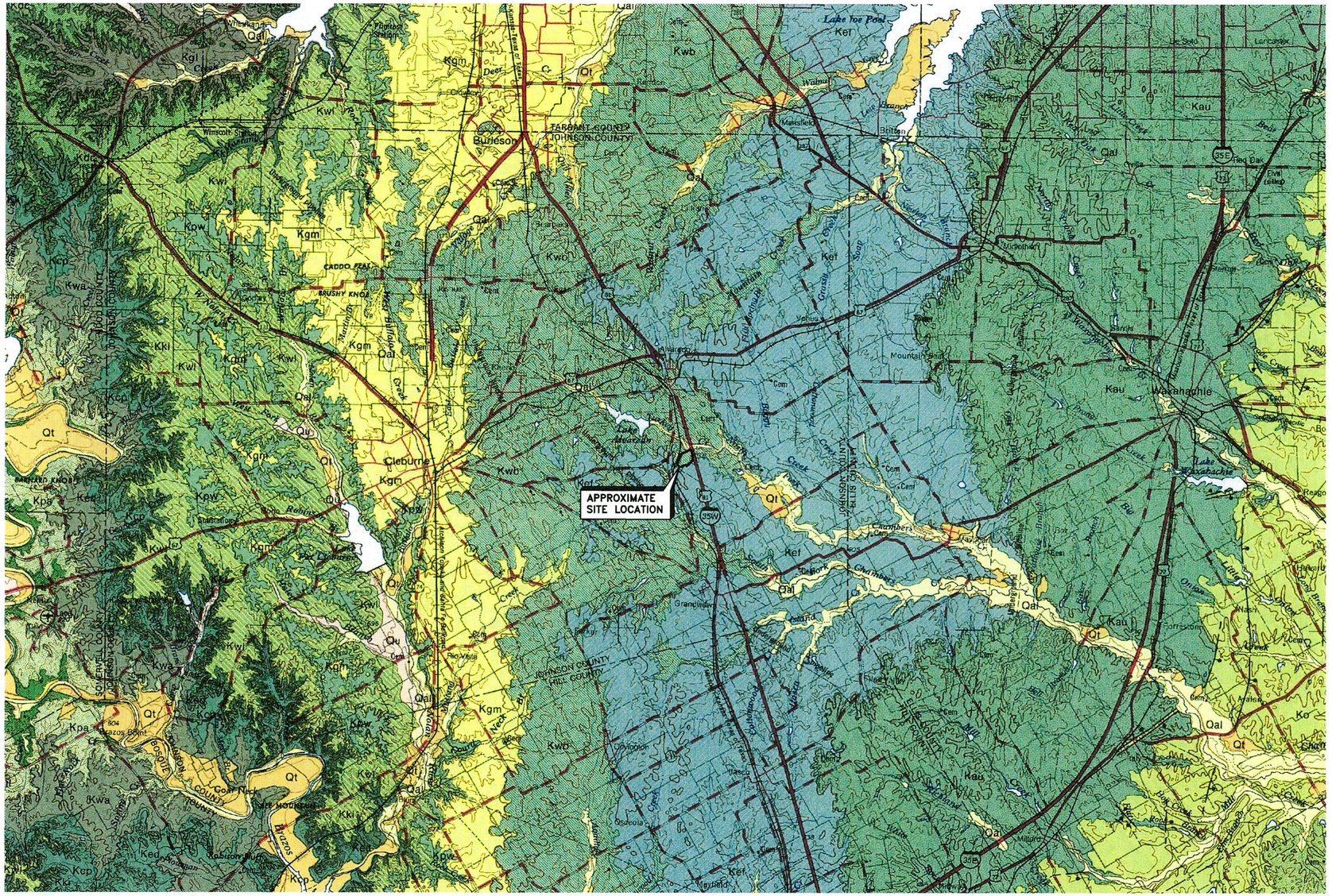


CONTENTS

FIGURE IIIG-A-1 – Regional Geologic Map
FIGURE IIIG-A-2 – Regional Structural Features Map
FIGURE IIIG-A-3 – Regional Geologic Cross Sections
FIGURE IIIG-A-4 – Regional Woodbine Aquifer Potentiometric Surface Map
FIGURE IIIG-A-5 – Regional Paluxy Aquifer Potentiometric Surface Map
FIGURE IIIG-A-6 – Water Well Location Map
FIGURE IIIG-A-7 – Oil and Gas Well Location Map

GeoSearch Water Well Report	IIIG-A-8
Supplementary State of Texas Water Well Information	IIIG-A-130
Onsite Water Well Report	IIIG-A-190
GeoSearch Oil and Gas Well Report	IIIG-A-192




APPROXIMATE SITE LOCATION
Burleson
Cleburne
Mansfield
Joshua
Godley
Grandview
Venus
Alvarado
Mountain Peak
Lake Joe Pool
Lake Arlington
Lake Benbrook
Lake Waxahachie
Britain
Maypearl
Midlothian
Waxahachie
Ovilla
Red Oak
Ferris
Sardis
Forreston
Oak Leaf
Ennis
Italy
Milford
Palmer
Rice
Corsicana
Kerens
Blooming Grove
Richland
Frost
Streetman
Fairfield
Teague
Buffalo
Wortham
Marquez
Normangee
Madisonville
Bryan
College Station
Navasota
Hearne
Calvert
Franklin
Bremond
Hubbard
Mexia
Groesbeck
Thornton
Kosse
Jewett
Leona
Oletha
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Buffalo
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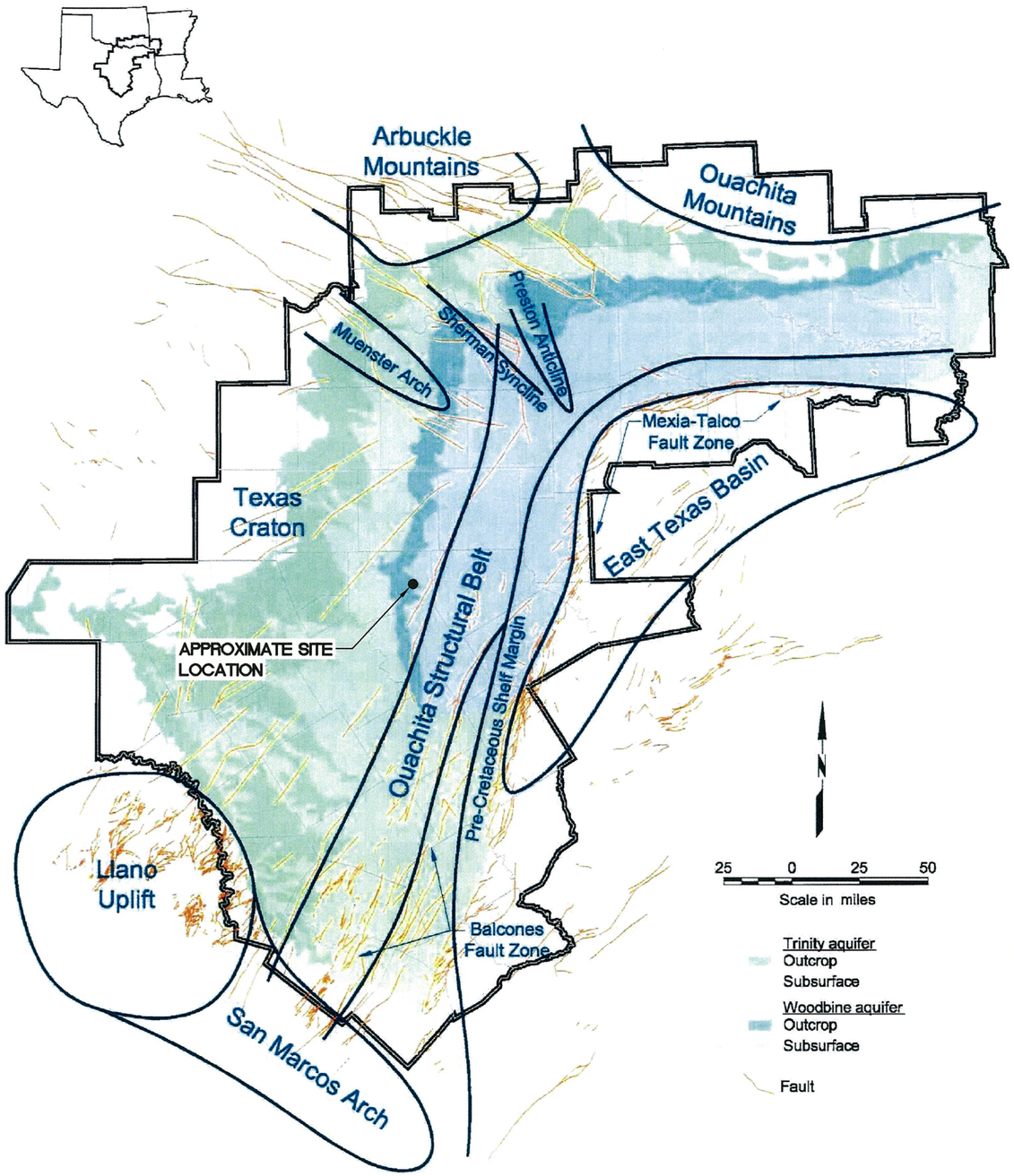
Dew
Teague
Fairfield
Streetman
Kerens
Corsicana
Blooming Grove
Richland
Frost



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NOTE:

1. REGIONAL STRUCTURAL FEATURES MAP ADAPTED FROM HARDEN ET AL, 2004, NORTHERN TRINITY/WOODBINE AQUIFER GROUNDWATER AVAILABILITY MODEL, TEXAS WATER DEVELOPMENT BOARD.

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MAJOR PERMIT AMENDMENT
REGIONAL STRUCTURAL FEATURES MAP

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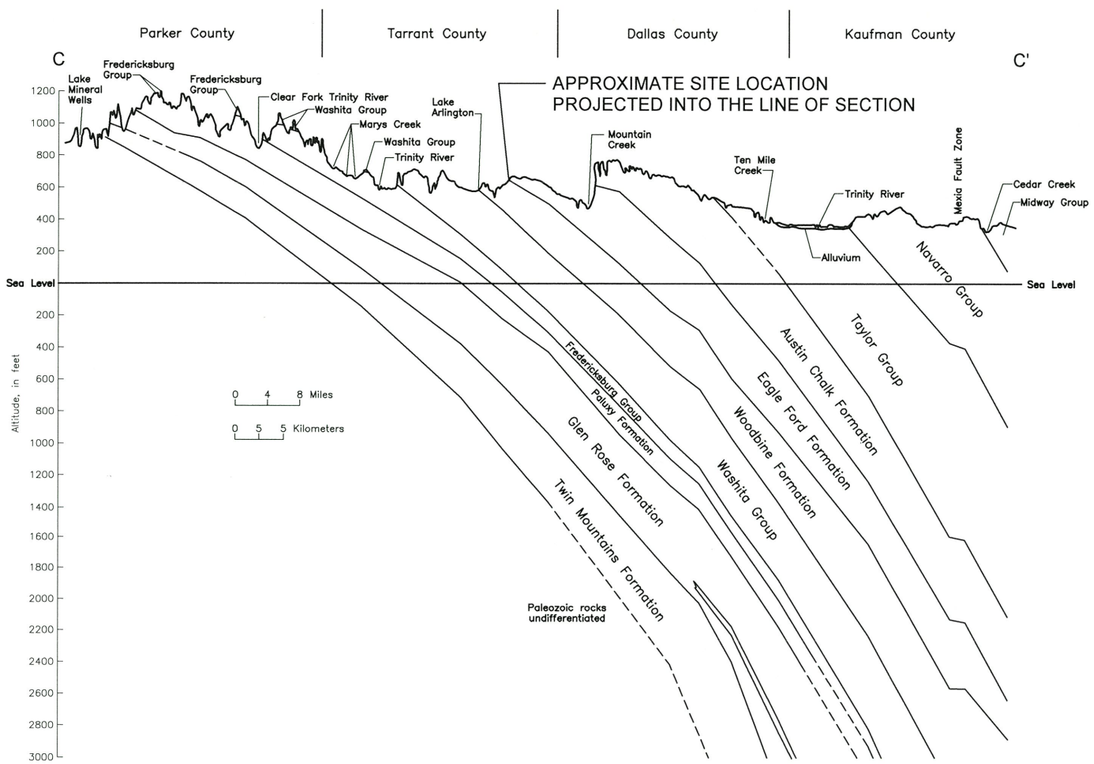
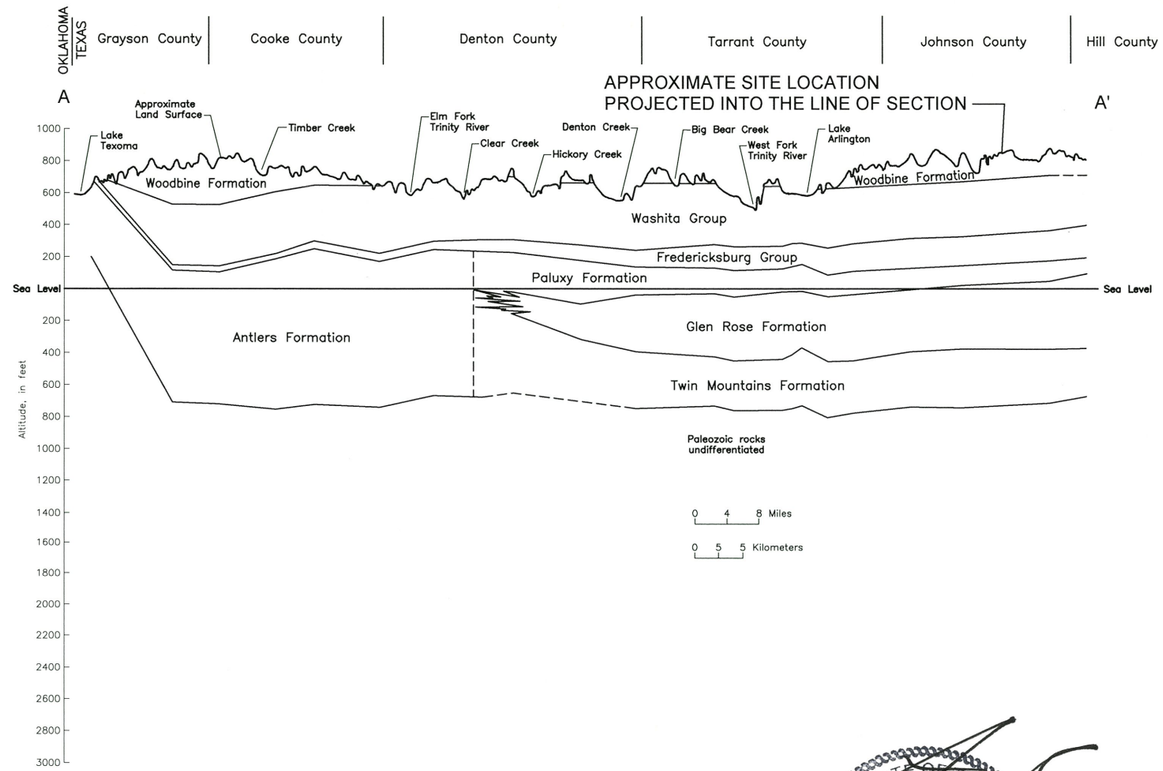
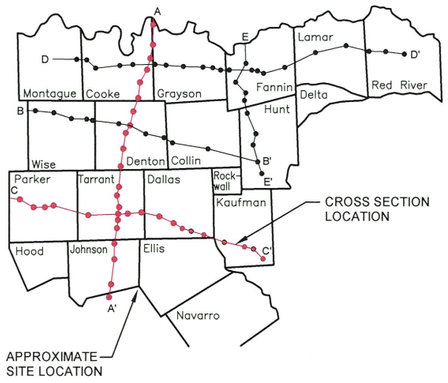
FIGURE IIIG-A-2







INDEX MAP
NTS

NOTE:

1. CROSS SECTIONS ADAPTED FROM NORDSTROM 1982, OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUNDWATER IN THE CRETACEOUS, AQUIFERS OF NORTH CENTRAL TEXAS, TEXAS WATER DEVELOPMENT BOARD REPORT 269.

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MAJOR PERMIT AMENDMENT
REGIONAL GEOLOGIC CROSS SECTIONS

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FIGURE IIIG-A-3

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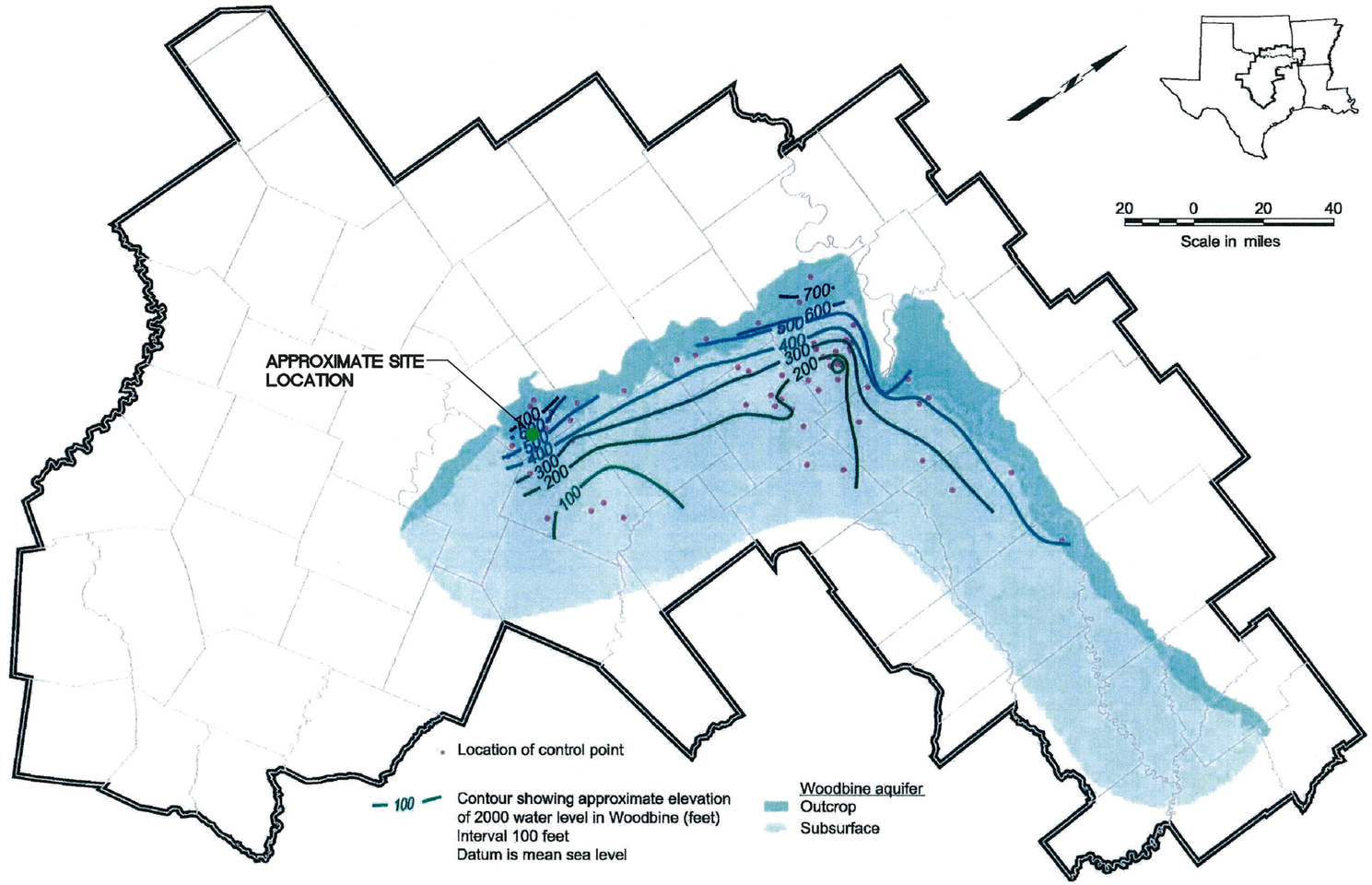

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NOTES:

1. WOODBINE AQUIFER POTENTIOMETRIC SURFACE ELEVATIONS MEASURED IN 2000 BY TEXAS WATER DEVELOPMENT BOARD.
2. POTENTIOMETRIC SURFACE MAP ADAPTED FROM HARDEN ET AL, 2004, NORTHERN TRINITY/WOODBINE AQUIFER GROUNDWATER AVAILABILITY MODEL, TEXAS WATER DEVELOPMENT BOARD.

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REGIONAL WOODBINE AQUIFER POTENTIOMETRIC SURFACE MAP

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FIGURE IIIG-A-4

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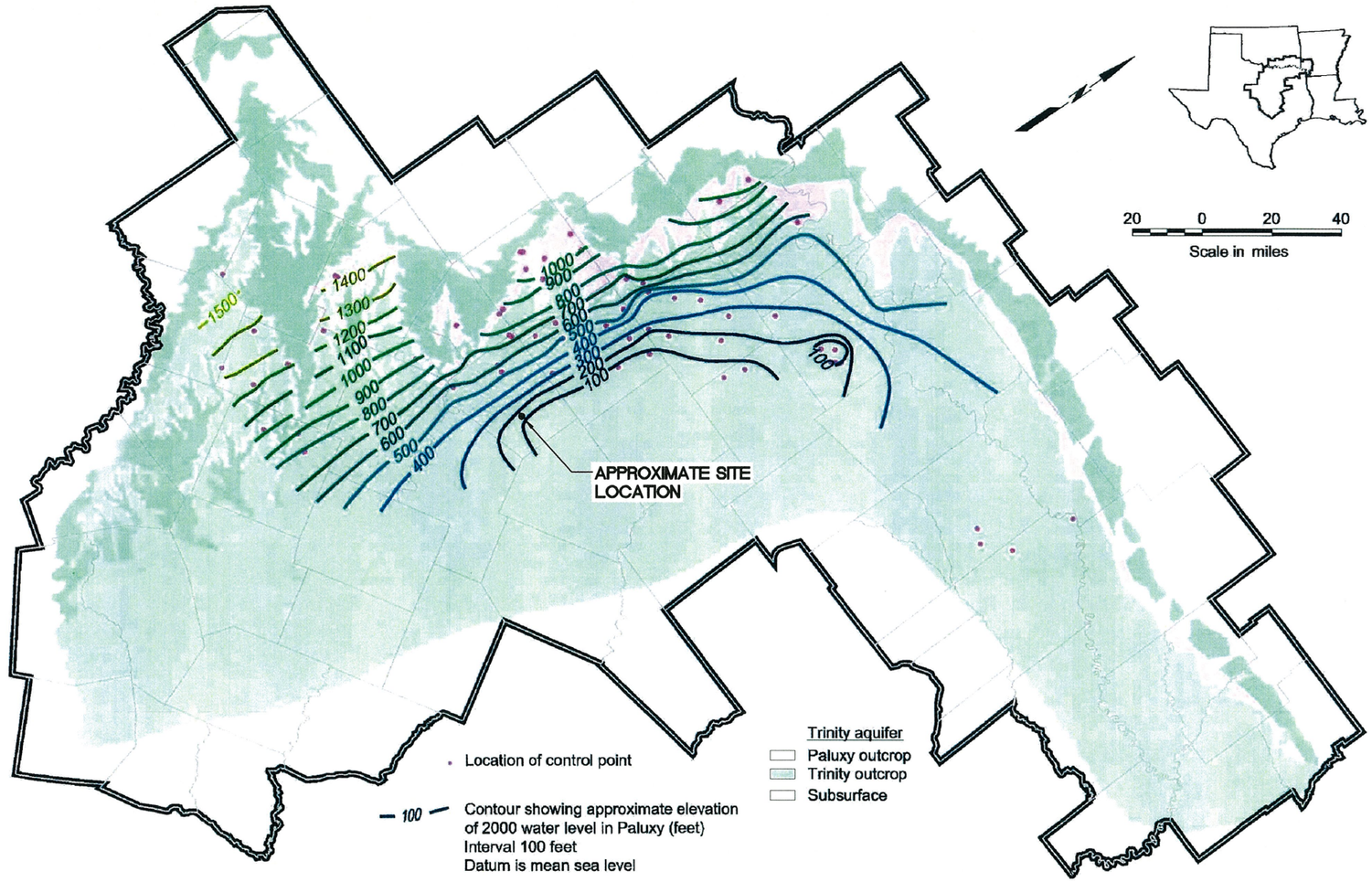

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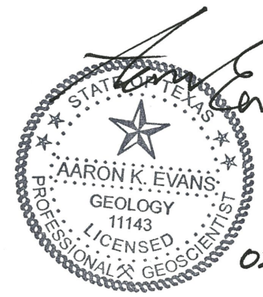
Scale in miles



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NOTES:

1. PALUXY AQUIFER POTENTIOMETRIC SURFACE ELEVATIONS MEASURED IN 2000 BY TEXAS WATER DEVELOPMENT BOARD.
2. POTENTIOMETRIC SURFACE MAP ADAPTED FROM HARDEN ET AL, 2004, NORTHERN TRINITY/WOODBINE AQUIFER GROUNDWATER AVAILABILITY MODEL, TEXAS WATER DEVELOPMENT BOARD.

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REGIONAL PALUXY AQUIFER POTENTIOMETRIC SURFACE MAP

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FIGURE IIIG-A-5

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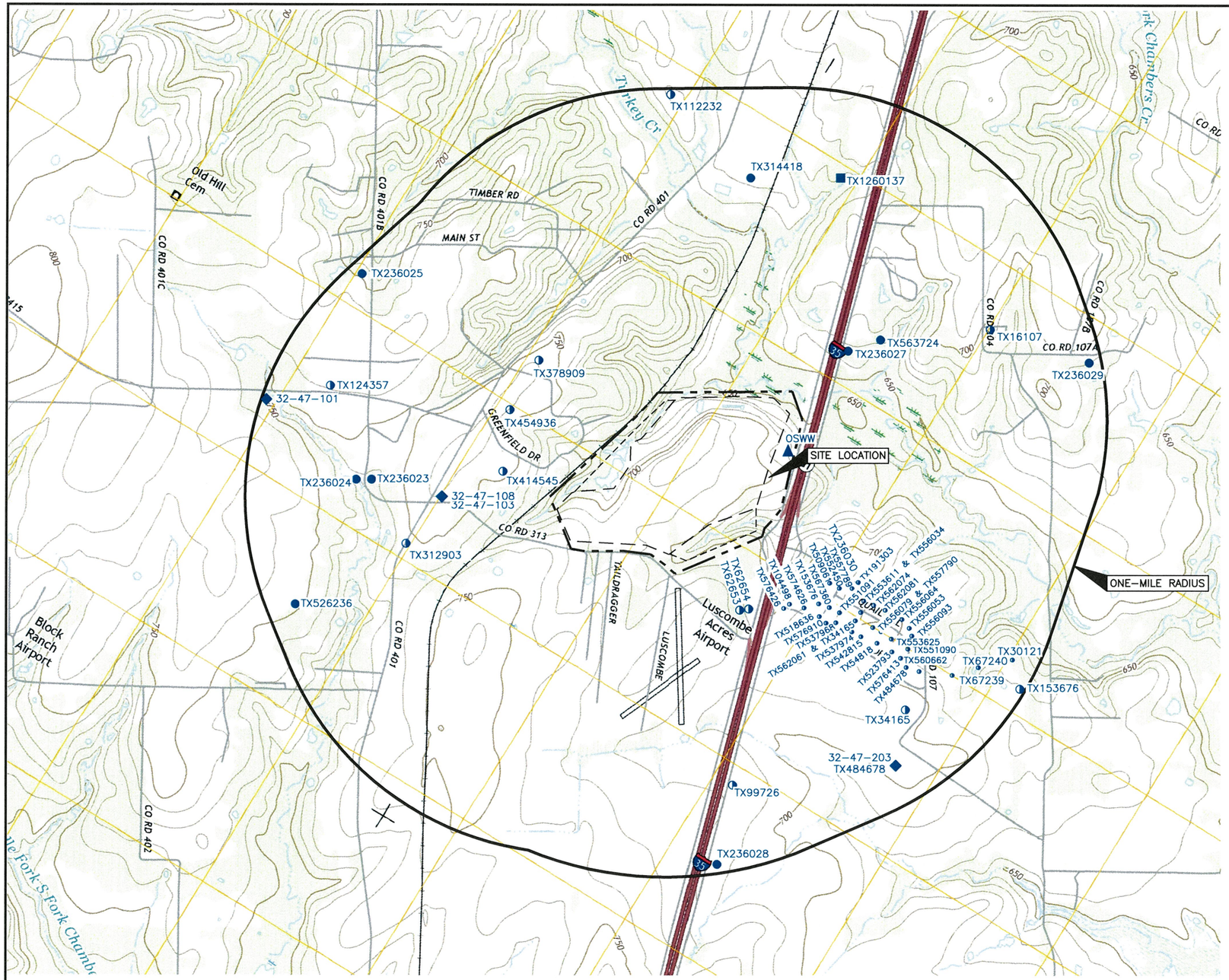

0 1000 2000
SCALE IN FEET

LEGEND

PERMIT BOUNDARY
PERMITTED LIMITS OF WASTE
PROPOSED LIMITS OF WASTE

ROAD CLASSIFICATION

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

- TX236023 — WATER WELL IDENTIFIED IN TCEQ RECORDS
- TX191303 — WATER WELL IDENTIFIED IN SSDRD RECORDS
- 32-47-108 — WATER WELL IDENTIFIED IN TWDB RECORDS
- TX1260137 — WATER WELL IDENTIFIED IN WC10 RECORDS
- OSWW — ON-SITE WATER WELL IDENTIFIED DURING SITE RECONNAISSANCE AND IN FACILITY RECORDS (SEE NOTE 4)

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NOTE:

1. SITE LOCATION BASE MAP ACQUIRED FROM USGS 7-5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS REFERENCED ABOVE.
2. WATER WELLS IDENTIFIED IN TCEQ, SSDRD, TWDB, AND TURKEY CREEK LANDFILL SITE RECORDS IN OCTOBER AND NOVEMBER OF 2021.
3. WATER WELL LOCATIONS PROVIDED BY GEOSEARCH, SSDRD, TCEQ, AND TWDB INTERACTIVE DATABASE VIEWER AND MODIFIED BASED ON REVIEW OF INDIVIDUAL WATERWELL REPORTS, GOOGLE EARTH AERIAL IMAGES, AND SITE RECONNAISSANCE PERFORMED BY WCG.
4. ONSITE WATERWELL LOCATION AND INFORMATION OBTAINED FROM HISTORICAL SITE MAP AND WATERWELL REPORT IN FACILITY RECORDS AND VERIFIED BY SITE RECONNAISSANCE.

ALVARADO, TX
2016

GRANDVIEW, TX
2016

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 14S
10 000-foot ticks: Texas Coordinate System of 1983 (north central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2014
Roads..... U.S. Census Bureau, 2014 - 2015
Names.....GNIS, 2015
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2004
Boundaries.....Multiple sources; see metadata file 1972 - 2015

Wetlands.....FWS National Wetlands Inventory 1977 - 2014

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MAJOR PERMIT AMENDMENT
WATER WELL LOCATION MAP

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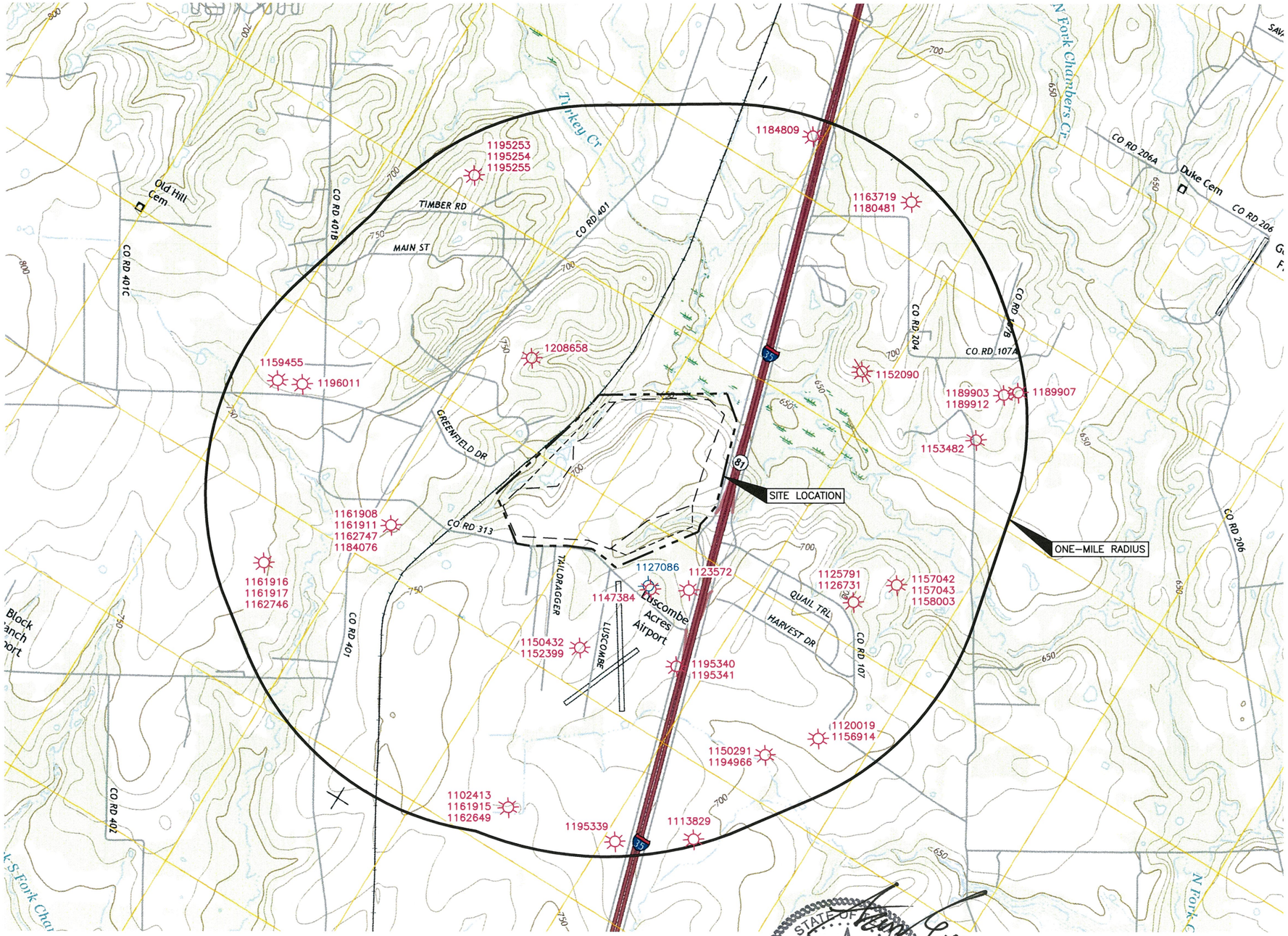
FIGURE IIIG-A-6

O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-A-6-WATER WELL MAP.dwg, farrington, 1:2



0 1000 2000
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE

ROAD CLASSIFICATION

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

- DRY HOLE
- GAS WELL
- PLUGGED GAS WELL

ALVARADO, TX
2016

GRANDVIEW, TX
2016

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 14S
10 000-foot ticks: Texas Coordinate System of 1983 (north
central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2014
Roads..... U.S. Census Bureau, 2014 - 2015
Names.....GNIS, 2015
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2004
Boundaries.....Multiple sources; see metadata file 1972 - 2015

Wetlands.....FWS National Wetlands Inventory 1977 - 2014

NOTE:

1. ADAPTED FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS REFERENCED ABOVE.
2. PERMITTED OIL AND GAS WELL LOCATIONS IN LANDFILL VICINITY OBTAINED FROM TEXAS RAILROAD COMMISSION ONLINE GIS AT http://www.gisp.rrc.texas.gov/gisviewer2/ IN NOVEMBER 2021.

STATE OF TEXAS
AARON K. EVANS
GEOLOGY
11143
LICENSED
PROFESSIONAL GEOSCIENTIST

02/22/22

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: IIIG-A-7-OIL AND WELL MAP.DWG
DRAWN BY: JDW
DESIGN BY: AKE
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
OIL AND GAS WELLS WITHIN ONE-MILE RADIUS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIG-A-7

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O:\0771\368EXPANSION 2021\PART III\IIIG\IIIG-A-7-OIL AND GAS WELL MAP.dwg, rarrington, 1:2

GEOSEARCH WATER WELL REPORT

GeoSearch

On time. On target. In touch.™

Texas Water Well Report (Extended Radius)

Target Property:

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Johnson County, Texas 76009

Prepared For:

Weaver Consultants Group-Benbrook

Order #: 169781
Job #: 423285
Date: 09/14/2021

phone: 888-396-0042 · fax: 512-472-9967 · www.geo-search.com

TARGET PROPERTY SUMMARY

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Johnson County, Texas 76009

USGS Quadrangle: ***Grandview, TX***
Target Property Geometry: ***Area***

Target Property Longitude(s)/Latitude(s):
(-97.200886, 32.360398), (-97.199400, 32.359786), (-97.197827, 32.355351), (-97.197980, 32.355036), (-97.198067, 32.354776), (-97.198133, 32.354405), (-97.198155, 32.354238), (-97.198155, 32.354108), (-97.198089, 32.354033), (-97.201214, 32.350266), (-97.202940, 32.350489), (-97.203683, 32.350285), (-97.206130, 32.349116), (-97.207005, 32.348856), (-97.209583, 32.350805), (-97.208250, 32.354126), (-97.207354, 32.356706), (-97.207223, 32.357578), (-97.200886, 32.360398), (-97.200886, 32.360398)

County/Parish Covered:
Johnson (TX)

Zipcode(s) Covered:
Alvarado TX: 76009
Grandview TX: 76050

State(s) Covered:
TX

Disclaimer - The information provided in this report was obtained from a variety of public sources. GeoSearch cannot ensure and makes no warranty or representation as to the accuracy, reliability, quality, errors occurring from data conversion or the customer's interpretation of this report. This report was made by GeoSearch for exclusive use by its clients only. Therefore, this report may not contain sufficient information for other purposes or parties. GeoSearch and its partners, employees, officers and independent contractors cannot be held liable for actual, incidental, consequential, special or exemplary damages suffered by a customer resulting directly or indirectly from any information provided by GeoSearch.

DATABASE FINDINGS SUMMARY

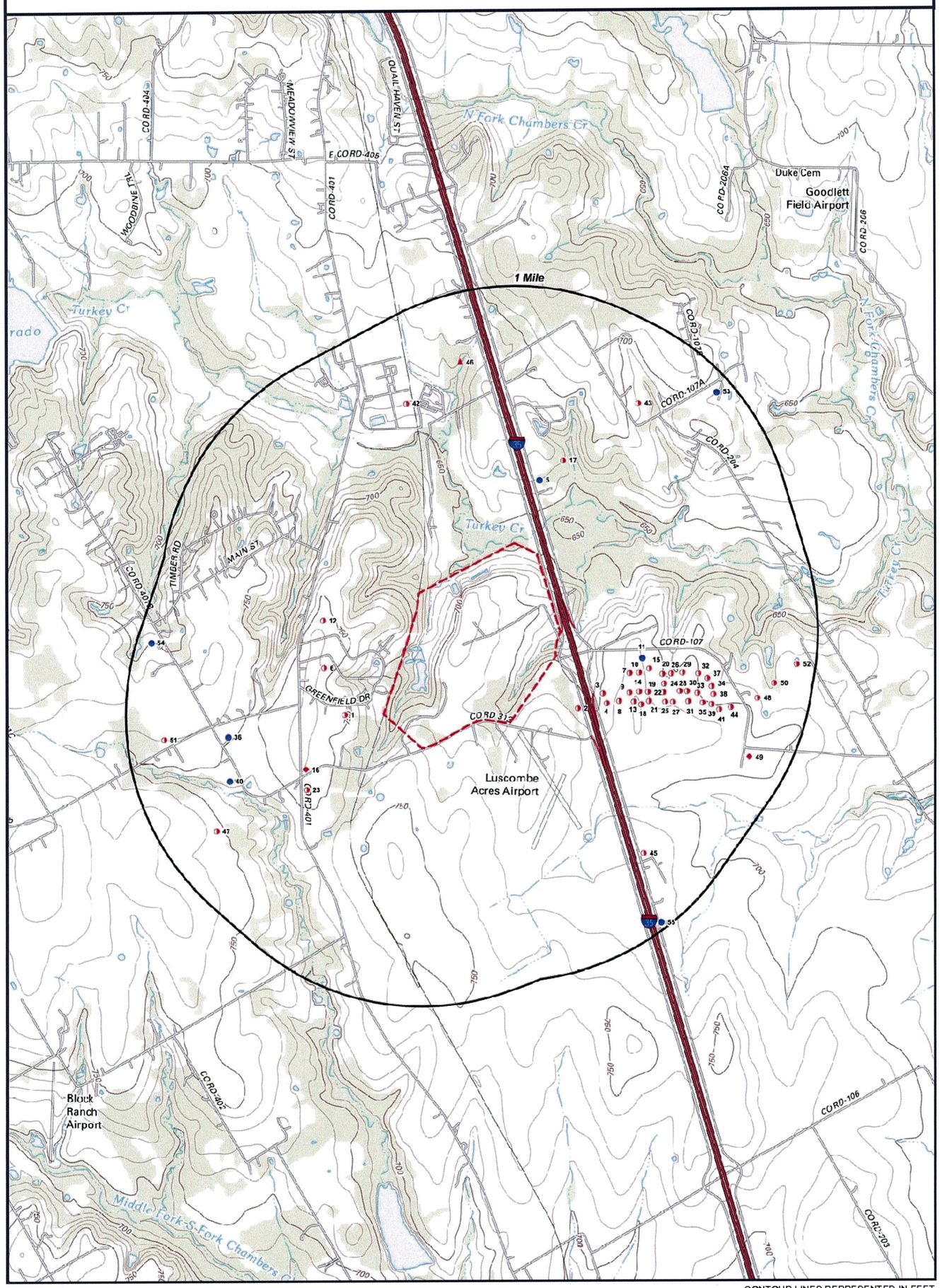
DATABASE	ACRONYM	LOCA-TABLE	UNLOCA-TABLE	SEARCH RADIUS (miles)
FEDERAL				
UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM	NWIS	1	0	1.0000
SUB-TOTAL		**1**	**0**	
STATE (TX)				
SELECT SUBMITTED DRILLERS REPORT DATABASE WELLS	SSDRD	53	0	1.0000
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS	TCEQ	7	0	1.0000
TEXAS WATER DEVELOPMENT BOARD GROUNDWATER DATABASE	TWDB	3	0	1.0000
WATER UTILITY DATABASE	WUD	3	0	1.0000
SUB-TOTAL		**66**	**0**	
TOTAL		**67**	**0**	

LOCATABLE DATABASE FINDINGS

ACRONYM	SEARCH RADIUS (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
FEDERAL								
NWIS	1.000	0	0	0	1	0	NS	1
SUB-TOTAL		**0**	**0**	**0**	**1**	**0**	**0**	**1**
STATE (TX)								
SSDRD	1.000	0	0	4	28	21	NS	53
TCEQ	1.000	0	0	0	2	5	NS	7
TWDB	1.000	0	0	0	2	1	NS	3
WUD	1.000	0	0	0	2	1	NS	3
SUB-TOTAL		**0**	**0**	**4**	**34**	**28**	**0**	**66**
TOTAL		**0**	**0**	**4**	**35**	**28**	**0**	**67**

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

WATER WELL



Target Property (TP)
SSDRD
TCEQ
TWDB
WUD

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Texas
76009

CONTOUR LINES REPRESENTED IN FEET

N W E S

0' 1000' 2000' 3000'
SCALE: 1" = 2000'

REPORT SUMMARY OF LOCATABLE SITES

MAP ID#	DATABASE NAME	SITE ID#	DISTANCE FROM SITE	SITE NAME	ADDRESS	CITY, ZIP CODE	PAGE #
1	SSDRD	TX414545	0.149 W	JIM GRIMLAN	7500 GREENFIELD DR.	ALVARADO, 76009	1
2	SSDRD	TX62653	0.182 ESE	STROUD ENERGY	EXIT 17 & I 35	ALVARADO, 76009	2
2	SSDRD	TX62654	0.184 ESE	STROUD ENERGY	I 35 @ EXIT 17	ALVARADO, 76009	3
3	SSDRD	TX104498	0.230 ESE	STEEL MASTER HOMES			4
4	SSDRD	TX576426	0.265 ESE	JHHB, LLC	8000 HARVEST DR.	GRANDVIEW	5
5	TCEQ	TX236027	0.266 NNE	TIM COLE			6
6	SSDRD	TX454936	0.278 WNW	JOEL RODRIGUEZ	3909 COUNTY ROAD 401	ALVARADO	8
7	SSDRD	TX509061	0.292 E	FERNANDO LARIZ	9316 WHEATFIELD RD.	GRANDVIEW, 76050	9
8	SSDRD	TX524171	0.299 ESE	FERNANDO LARIZ	8016 HARVEST DR.	GRANDVIEW, 76050	10
9	SSDRD	TX153676	0.317 ESE	MOLINA, SERVANDO	9332 WHEATFIELD	GRANDVIEW, 76050	11
10	SSDRD	TX552450	0.328 E	CODY SPENCER	8100 QUAIL TRAIL	GRANDVIEW, 76050	12
11	TCEQ	TX236030	0.333 ESE	BILLY HILTON			13
12	SSDRD	TX378909	0.339 WNW	DAVID PICKETT	7429 RIDGEVIEW	ALVARADO, 76009	16
13	SSDRD	TX518636	0.348 ESE	LARIZ CUSTOM HOMES, LLC	8032 HARVEST DR	GRANDVIEW	17
14	SSDRD	TX567360	0.350 ESE	LARIZ FAMILY HOMES	8101 HARVEST DR	GRANDVIEW, 76050	18
15	SSDRD	TX191303	0.365 E	J.D. MEADOWS	8113 QUAIL TRAIL	GRANDVIEW, 76050	19
15	SSDRD	TX557789	0.364 E	ANTLER HOME BUILDERS LLC	8108 QUAIL TRL	GRANDVIEW	20
16	TWDB	32-47-108	0.370 WSW	JOHNSON COUNTY SUD			21
16	WUD	2417939839	0.370 WSW	JOHNSON COUNTY SUD	JOHNSON COUNTY	ALVARADO, 76009	43
16	WUD	467859982	0.370 WSW	JOHNSON COUNTY SUD	JOHNSON COUNTY	ALVARADO, 76009	44
16	NWIS	USGS_32205109	0.370 WSW	PX-32-47-103			45
16	TWDB	32-47-103	0.370 WSW	JOHNSON COUNTY SUD			46
17	SSDRD	TX563724	0.371 NNE	TYLER BLACK	8719 I 35 W	ALVARADO, 76004	55
18	SSDRD	TX576910	0.379 ESE	LARIZ FAMILY HOMES	8100 HARVEST DR	GRANDVIEW, 76050	56
19	SSDRD	TX551091	0.381 ESE	ANTLER HOME BUILDERS, LLC	8105 HARVEST DR.	GRANDVIEW	57
20	SSDRD	TX553611	0.397 E	ANTLER HOMEBUILDERS, LLC	8116 QUAIL TRAIL	GRANDVIEW, 76049	58
20	SSDRD	TX556034	0.418 E	ANTLER HOMEBUILDERS, LLC	8124 QUAIL TRAIL	GRANDVIEW, 76050	59

REPORT SUMMARY OF LOCATABLE SITES

MAP ID#	DATABASE NAME	SITE ID#	DISTANCE FROM SITE	SITE NAME	ADDRESS	CITY, ZIP CODE	PAGE #
21	SSDRD	TX537968	0.400 ESE	ANTLER HOMEBUILDERS LLC	8104 HARVEST DRIVE	GRANDVIEW, 76050	60
22	SSDRD	TX551092	0.414 ESE	ANTLER HOME BUILDERS, LLC	8109 HARVEST DR	GRANDVIEW, 76050	61
22	SSDRD	TX562061	0.436 ESE	ANTLER HOMEBUILDERS LLC	8117 HARVEST DRIVE	GRANDVIEW, 76050	62
23	SSDRD	TX312903	0.417 SW	BOB MAZE	4341 CR 401	GRANDVIEW, 76050	63
24	SSDRD	TX34165	0.432 ESE	TERRELL SULLIVAN	8117 QUAIL TRAIL	GRANDVIEW, 76050	64
25	SSDRD	TX537974	0.433 ESE	ANTLER HOMEBUILDERS, LLC	8108 HARVEST DRIVE	GRANDVIEW, 76050	65
25	SSDRD	TX542816	0.458 ESE	ANTLER HOMEBUILDERS, LLC	8116 HARVEST DR	GRANDVIEW, 76050	66
26	SSDRD	TX562074	0.451 E	ANTLER HOMEBUILDERS, LLC	8200 QUAIL TRAIL	GRANDVIEW, 76050	67
27	SSDRD	TX542815	0.486 ESE	ANTLER HOMEBUILDERS, LLC	8200 HARVEST DRIVE	GRANDVIEW, 76050	68
28	SSDRD	TX556079	0.474 ESE	JHHB LLC	8201 HARVEST DRIVE	GRANDVIEW, 76050	69
28	SSDRD	TX562052	0.498 ESE	ANTLER HOMEBUILDERS LLC	8209 HARVEST DRIVE	GRANDVIEW, 76050	70
29	SSDRD	TX562077	0.513 E	ANTLER HOME BUILDERS, LLC	8216 QUAIL TRAIL	GRANDVIEW, 76050	71
29	SSDRD	TX562081	0.493 E	ANTLER HOME BUILDERS, LLC	8208 QUAIL TRAIL	GRANDVIEW, 76050	72
30	SSDRD	TX557790	0.525 ESE	ANTLER HOME BUILDERS, LLC	8217 HARVEST DR	GRANDVIEW, 76050	73
31	SSDRD	TX542817	0.515 ESE	ANTLER HOMEBUILDERS, LLC	8208 HARVEST DR	GRANDVIEW, 76050	74
31	SSDRD	TX542818	0.541 ESE	ANTLER HOMEBUILDERS, LLC	8216 HARVEST DR	GRANDVIEW, 76050	75
32	SSDRD	TX556064	0.555 E	ANTLER HOMEBUILDERS, LLC	8300 QUAIL TRAIL	GRANDVIEW, 76050	76
33	SSDRD	TX553625	0.565 ESE	ANTLER HOMEBUILDERS, LLC	8225 HARVEST DRIVE	GRANDVIEW, 76050	77
34	SSDRD	TX556093	0.592 E	ANTLER HOMEBUILDERS, LLC	8308 QUAIL TRAIL	GRANDVIEW, 76050	78
35	SSDRD	TX523793	0.596 ESE	JOSHUA RAMOS	8228 HARVEST DR.	GRANDVIEW, 76050	79
36	TCEQ	TX236023	0.610 W	BILL WEST			80

REPORT SUMMARY OF LOCATABLE SITES

MAP ID#	DATABASE NAME	SITE ID#	DISTANCE FROM SITE	SITE NAME	ADDRESS	CITY, ZIP CODE	PAGE #
37	SSDRD	TX556053	0.614 E	ANTLER HOMEBUILDERS, LLC	8316 QUAIL TRAIL	GRANDVIEW, 76050	83
38	SSDRD	TX551090	0.627 ESE	ANTLER HOME BUILDERS, LLC	8324 QUAIL TRIAL	GRANDVIEW, 76050	84
39	SSDRD	TX560662	0.630 ESE	LARIZ FAMILY HOMES	8232 HARVEST DR	GRANDVIEW, 76050	85
40	TCEQ	TX236024	0.650 WSW	JOE SIMS			86
41	SSDRD	TX576413	0.665 ESE	ANTLER HOMEBUILDERS LLC	8300 HARVEST DR.	GRANDVIEW	88
42	SSDRD	TX314418	0.675 NNW	HALLIBURTON JET RESEARCH CENTER	8432 S I-35,W	ALVARADO, 76009	89
43	SSDRD	TX16107	0.705 NE	J. WIGGLESWORTH	3125 CR 204	ALVARADO, 76009	90
44	SSDRD	TX484676	0.705 ESE	DAN FINN	8308 HARVEST DR.	ALVARADO, 76009	91
45	SSDRD	TX99726	0.726 SE	MURPHY SCOTT RESOURCES, L.P.	9841 I 35 W	GRANDVIEW, 76050	92
46	WUD	4096000461	0.732 NNW	HALLIBURTON JET RESEARCH CENTER	JOHNSON COUNTY	ALVARADO, 76009	93
47	SSDRD	TX526236	0.790 WSW	LARRY WORD REVOCABLE TRUST	7140 CR 313	ALVARADO, 76009	94
48	SSDRD	TX67239	0.797 E	STROUD ENERGY	EXIT 17 & I 35	ALVARADO, 76009	95
49	TWDB	32-47-203	0.845 ESE	L. W. BURKS			96
50	SSDRD	TX67240	0.852 E	STROUD ENERGY	I 35 & EXIT 17	ALVARADO, 76009	100
51	SSDRD	TX124357	0.856 W	DEVON	CO 24 15	ALVARADO	101
52	SSDRD	TX30121	0.926 E	JIMMY & CLAUDIA ATLAS	8845 CR 107	GRANDVIEW, 76050	102
53	TCEQ	TX236029	0.939 NE	G A STAPLETON			103
54	TCEQ	TX236025	0.944 WNW	JACK HIXON			106
55	TCEQ	TX236028	0.971 SE	JAMES WIGGLESWORTH			109

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 1 **Distance from Property: 0.15 mi. W**

TRACK #: **414545**
DATE ENTERED: **2016-02-08**
OWNER NAME: **JIM GRIMLAN**
OWNER ADDRESS: **7500 GREENFIELD DR.**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.350806000** LONGITUDE: **-97.212144000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=414545&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2016-02-03**
DRILLING DATE (COMPLETED): **2016-02-03**
DEPTH DRILLED: **180'**

WATER LEVEL:
STATIC LEVEL: **130'**
WATER LEVEL DATE: **2016-02-03**
TYPE OF WATER: **WOODBINE**

TYPE OF WORK:
NEW WELL

PROPOSED USE:
DOMESTIC

COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING**
COMPANY ADDRESS: **P.O. BOX 2181**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 2 **Distance from Property: 0.18 mi. ESE**

TRACK #: **62653**
DATE ENTERED: **2005-07-14**
OWNER NAME: **STROUD ENERGY**
OWNER ADDRESS: **210 W. 6 TH ST., SUITE 500**
FT. WORTH, TX 76102
COUNTY: **JOHNSON**
LATITUDE: **32.350834000** LONGITUDE: **-97.196945000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=62653&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2005-07-06**
DRILLING DATE (COMPLETED): **2005-07-06**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **40'**
WATER LEVEL DATE: **2005-07-06**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
RIG SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 2 **Distance from Property: 0.18 mi. ESE**

TRACK #: **62654**
DATE ENTERED: **2005-07-14**
OWNER NAME: **STROUD ENERGY**
OWNER ADDRESS: **210 W. ^ TH STREET, SUITE 500**
FT. WORTH, TX 76102
COUNTY: **JOHNSON**
LATITUDE: **32.351112000** LONGITUDE: **-97.196667000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=62654&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2005-07-07**
DRILLING DATE (COMPLETED): **2005-07-07**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **40'**
WATER LEVEL DATE: **2005-07-07**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
RIG SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 3 **Distance from Property: 0.23 mi. ESE**

TRACK #: **104498**
DATE ENTERED: **2007-02-18**
OWNER NAME: **STEEL MASTER HOMES**
OWNER ADDRESS: **8001 HARVEST DR.**
GRANDVIEW, TX 76050
COUNTY: **ELLIS**
LATITUDE: **32.351945000** LONGITUDE: **-97.195000000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=104498&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2006-11-09**
DRILLING DATE (COMPLETED): **2006-11-09**
DEPTH DRILLED: **200'**

WATER LEVEL:
STATIC LEVEL: **140'**
WATER LEVEL DATE: **2006-11-09**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **BENNETT WATER WELL DRILLING, INC**
COMPANY ADDRESS: **7300 W. HWY 377**
TOLAR, TX 76476

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 4 **Distance from Property: 0.27 mi. ESE**

TRACK #: **576426**
DATE ENTERED: **2021-06-18**
OWNER NAME: **JHHB, LLC**
OWNER ADDRESS: **P. O. BOX 270285**
FLOWER MOUND, TX 75027
COUNTY: **JOHNSON**
LATITUDE: **32.351392000** LONGITUDE: **-97.194732000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=576426&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2021-06-16**
DRILLING DATE (COMPLETED): **2021-06-16**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 5 **Distance from Property: 0.27 mi. NNE**

ID NUMBER:	**TX236027**
STATE ID :	**32-47-2**
OWNER NAME:	**TIM COLE**
DATE DRILLED:	**05/17/2000**
DEPTH DRILLED:	**145'**
STATIC LEVEL:	**75'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.199201000**
LATITUDE:	**32.363974000**

1 PAGE(S) OF DRILLERS' LOGS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

Water Well ID: 236027

Send original copy by certified return receipt requested to: TDLR, P.O. Box 12157, Austin, TX 78711

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Tim Cole (Name) ADDRESS: 8717 S. I35 West (Street or RFD) Alvarado, Tx 76009 (City) (State) (Zip)

2) ADDRESS OF WELL'S LOCATION: County Johnson — Same address (Street, RFD or other) (City) (State) (Zip) Grid # 32-47-2

3) TYPE OF WORK (Check): [X] New Well [ ] Deepening [ ] Reconditioning [ ] Plugging

4) PROPOSED USE (Check): [ ] Monitor [ ] Environmental Soil Boring [X] Domestic [ ] Industrial [ ] Irrigation [ ] Injection [ ] Public Supply [ ] De-watering [ ] Test well
If Public Supply well, were plans submitted to the TNRCC? [ ] Yes [ ] No

5)

6) WELL LOG:
Date Drilling: Started 5-17 19 00 Completed 5-17 19 00

DIAMETER OF HOLE

Dia (in.)	From (ft.)	To (ft.)
7	Surface	145

7) DRILLING METHOD (Check): [ ] Driven [X] Air Rotary [ ] Mud Rotary [ ] Bored [ ] Air Hammer [ ] Cable Tool [ ] Jetted [ ] Other

From (ft.)	To (ft.)	Description and color of formation material
0	10	Top soil
10	30	Yellow clay
30	75	Gray shale
75	87	Hard sand
87	95	Sandy shale
95	105	Shale
105	135	Sand
135	145	Sand to lime

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): [ ] Open Hole [ ] Straight Wall [ ] Underreamed [X] Gravel Packed [ ] Other
If Gravel Packed give interval from 145 ft. to 90 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	Plastic	surf	145	
		Slotted	145	105	

9) CEMENTING DATA
Cemented from 0 ft. to 25 ft. No. of sacks used 3
90 ft. to 65 ft. No. of sacks used 6
Method used Measured & top loaded
Cemented by Geyer Drilling co. Inc.
Distance to septic system field lines or other concentrated contamination 115 ft.
Method of verification of above distance homeowner

13) [ ] Well plugged within 48 hours

Casing left in well: From (ft)	Casing left in well: To (ft)	Cement-bentonite placed in well: From (ft)	Cement-bentonite placed in well: To (ft)	Sacks used:

14) TYPE PUMP:
[ ] Turbine [ ] Jet [X] Submersible [ ] Cylinder [ ] Other
Depth to pump bowls, cylinder, jet, etc. 120 ft.

10) SURFACE COMPLETION
[ ] Specified Surface Slab Installed
[X] Specified Steel Sleeve Installed
[ ] Pitless Adapter Used
[ ] Approved Alternative Procedure Used

15) WELL TESTS:
Type test: [ ] Pump [X] Bailer [ ] Jetted [ ] Estimated
Yield: 20+ gpm with 0 ft. drawdown after 1 hrs.

11) WATER LEVEL:
Static level 75 ft. below land surface Date 5-17-00
Artesian flow gpm. Date

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
[ ] Yes [X] No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? [ ] Yes [X] No

12) PACKERS: Type Depth
NONE

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME: Geyer Drilling Co. Inc (Type or print) WELL DRILLER'S LICENSE NO. 4789 WPKL

ADDRESS: 108 W. Broad St (Street or RFD) Mansfield (City) Tx (State) 76063 (Zip)

(Signed) B. Blanco (Licensed Well Driller)

(Signed) A. Hernandez (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDLR FORM 001WWD (4/98) White - TDLR Yellow - DRILLER Pink - WELL OWNER

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 6 **Distance from Property: 0.28 mi. WNW**

TRACK #: **454936**
DATE ENTERED: **2017-07-06**
OWNER NAME: **JOEL RODRIGUEZ**
OWNER ADDRESS: **469 CAGLE CROW RD**
MONSFIELD, TX 76063
COUNTY: **JOHNSON**
LATITUDE: **32.353417000** LONGITUDE: **-97.213556000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=454936&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2017-05-08**
DRILLING DATE (COMPLETED): **2017-05-08**
DEPTH DRILLED: **30'**

WATER LEVEL:
STATIC LEVEL: **170'**
WATER LEVEL DATE: **2017-05-08**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **AFFORDABLE WATER WELL**
COMPANY ADDRESS: **P.O. BOX 1322**
BRIDGEPORT, TX 76426

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 7 **Distance from Property: 0.29 mi. E**

TRACK #: **509061**
DATE ENTERED: **2019-04-22**
OWNER NAME: **FERNANDO LARIZ**
OWNER ADDRESS: **9316 WHEATFIELD RD.**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.353065000** LONGITUDE: **-97.193213000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=509061&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2019-04-10**
DRILLING DATE (COMPLETED): **2019-04-10**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **140'**
WATER LEVEL DATE: **2019-04-10**
TYPE OF WATER: **POTABLE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING COMPANY**
COMPANY ADDRESS: **3311 NORTH COMMERCE STREET**
FORT WORTH, TX 76106

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 8 **Distance from Property: 0.30 mi. ESE**

TRACK #: **524171**
DATE ENTERED: **2019-10-15**
OWNER NAME: **FERNANDO LARIZ**
OWNER ADDRESS: **8016 HARVEST DR.**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.351513000** LONGITUDE: **-97.193920000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=524171&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2019-10-09**
DRILLING DATE (COMPLETED): **2019-10-09**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **120'**
WATER LEVEL DATE: **2019-10-09**
TYPE OF WATER: **POTABLE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING COMPANY**
COMPANY ADDRESS: **3311 NORTH COMMERCE STREET**
FORT WORTH, TX 76106

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 9 **Distance from Property: 0.32 mi. ESE**

TRACK #: **153676**
DATE ENTERED: **2008-09-18**
OWNER NAME: **MOLINA, SERVANDO**
OWNER ADDRESS: **42225 ROBINSON**
GRAND PRAIRIE, TX 75052
COUNTY: **JOHNSON**
LATITUDE: **32.351986000** LONGITUDE: **-97.193225000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=153676&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2008-05-20**
DRILLING DATE (COMPLETED): **2008-05-20**
DEPTH DRILLED: **180'**

WATER LEVEL:
STATIC LEVEL: **25'**
WATER LEVEL DATE: **2008-05-20**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **JIMMY D. MILLER**
COMPANY ADDRESS: **333 PR 4197**
DECATUR, TX 76234

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 10 **Distance from Property: 0.33 mi. E**

TRACK #: **552450**
DATE ENTERED: **2020-08-30**
OWNER NAME: **CODY SPENCER**
OWNER ADDRESS: **8100 QUAIL TRAIL**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.353087000** LONGITUDE: **-97.192586000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=552450&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-07-01**
DRILLING DATE (COMPLETED): **2020-07-01**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **2020-07-01**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **AFFORDABLE WATER WELL**
COMPANY ADDRESS: **P.O. BOX 1322**
BRIDGEPORT, TX 76426

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 11 **Distance from Property: 0.33 mi. ESE**

ID NUMBER:	**TX236030**
STATE ID :	**32-47-2**
OWNER NAME:	**BILLY HILTON**
DATE DRILLED:	**04/22/1987**
DEPTH DRILLED:	**180'**
STATIC LEVEL:	**90'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.192375000**
LATITUDE:	**32.353926000**

2 PAGE(S) OF DRILLERS' LOGS

Please use black ink. Send original copy by certified mail to the Texas Water Commission P.O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

1) OWNER Billy Hilton (Name) Address 1105 Travis St. (Street or RFD) Alvarado (City) Texas (State) (Zip)

2) LOCATION OF WELL: County Johnson 3 miles in S. (N.E., S.W., etc.) direction from Alvarado (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

Well No. 5

☐ Legal description:
Section No. ____ Block No. ____ Township ____
Abstract No. ____ Survey Name ____
Distance and direction from two intersecting section or survey lines ____
☑ See attached map: on 32-46-6

3) TYPE OF WORK (Check): ☑ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☑ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other ____

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Driven ☐ Air Rotary ☐ Cable Tool ☐ Other ____

6) WELL LOG:
Date Drilling: Started 4/19/87 Completed 4/22/87

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	180
	180	0

From (ft.)	To (ft.)	Description and color of formation material
0	50	Sandy Clay + Black Dirt
50	90	Shale + Rock
90	140	Sandy Shale
140	150	Rock + Shale
150	180	Sandy Shale

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☑ Gravel Packed ☐ Other ____
If Gravel Packed give interval . . . from 180 ft. to 170 ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4½	N	Steel	180	0	154
		Slotted	160	170	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 170 ft. to 0 ft. No. of Sacks Used 3
____ ft. to ____ ft. No. of Sacks Used ____
Method used Poured
Cemented by Gearld Warren

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☑ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 90 ft. below land surface Date 4/22/87
Artesian flow ____ gpm. Date ____

12) PACKERS: Type ____ Depth: None

13) TYPE PUMP:
☐ Turbine ☐ Jet ☑ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., 147 ft.

14) WELL TESTS:
Type Test: ☑ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 20 gpm with 0 ft. drawdown after 24 hrs.

RECEIVED
JUN 10 1987
TEXAS WATER COMMISSION

(Use reverse side if necessary)

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☑ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

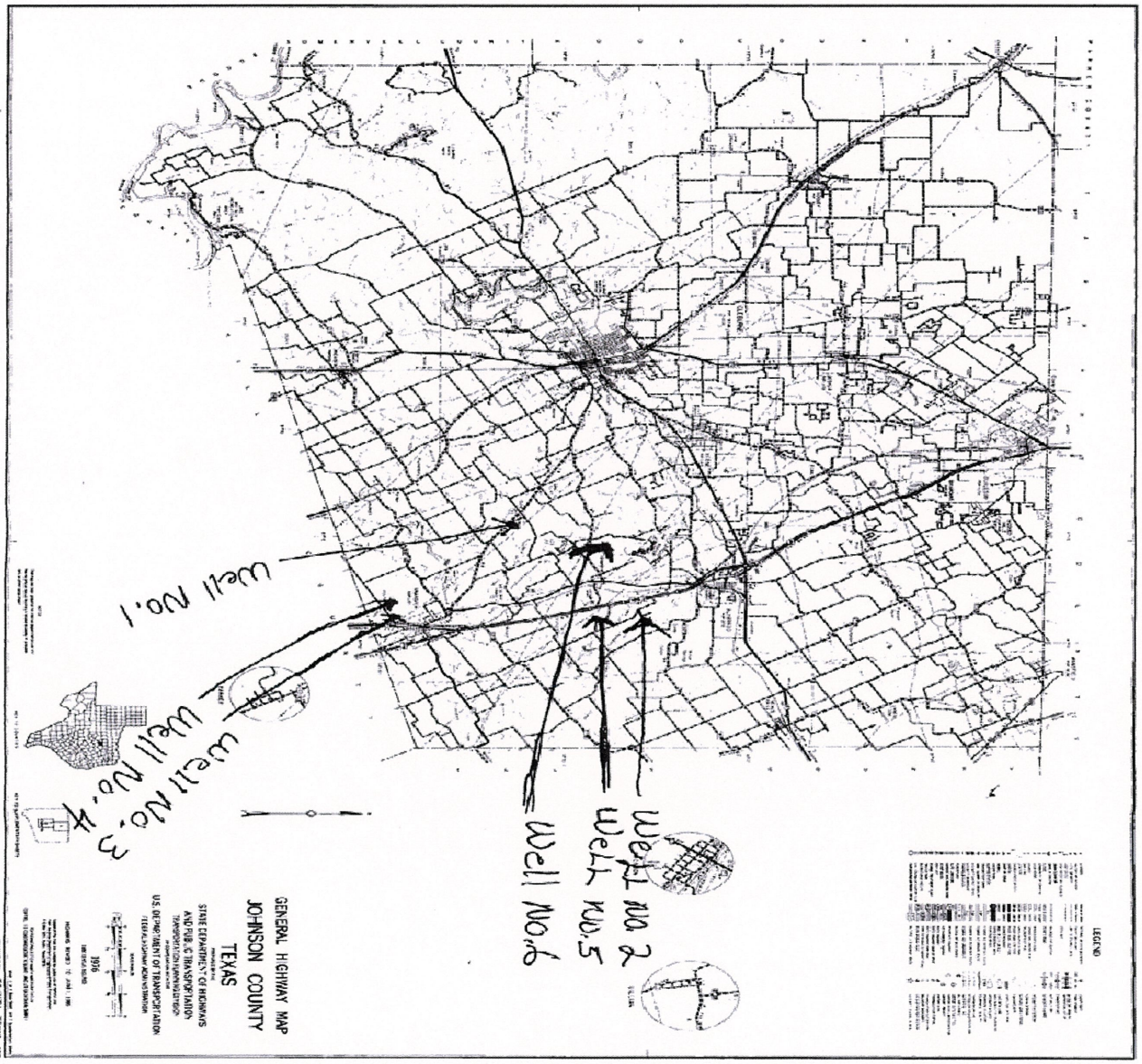
COMPANY NAME Warren Well Service's (Type or Print) Water Well Driller's License No. 1557
ADDRESS P. O. Box 106 (Street or RFD) Cranfills Gap (City) Texas (State) 76637 (Zip)
(Signed) Gerald Warren (Licensed Water Well Driller) (Signed) Ernesto Alvarez (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 33-47-2
Located on map ____

TWC 0392 (Rev. 06-10-85) TEXAS WATER COMMISSION COPY

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967


well No.1
well No.3
well No.4
Well No 2
Well No.5
Well No.6
GENERAL HIGHWAY MAP
JOHNSON COUNTY
TEXAS
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION
1976
JOHNSON COUNTY, TEXAS

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 12 **Distance from Property: 0.34 mi. WNW**

TRACK #: **378909**
DATE ENTERED: **2014-10-23**
OWNER NAME: **DAVID PICKETT**
OWNER ADDRESS: **7429 RIDGEVIEW**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.356112000** LONGITUDE: **-97.213612000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=378909&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2014-10-16**
DRILLING DATE (COMPLETED): **2014-10-16**
DEPTH DRILLED: **200'**

WATER LEVEL:
STATIC LEVEL: **140'**
WATER LEVEL DATE: **2014-10-16**
TYPE OF WATER: **WOODBINE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING**
COMPANY ADDRESS: **P.O. BOX**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 13 **Distance from Property: 0.35 mi. ESE**

TRACK #: **518636**
DATE ENTERED: **2019-08-15**
OWNER NAME: **LARIZ CUSTOM HOMES, LLC**
OWNER ADDRESS: **14133 SANTA F CT**
HASLET, TX 76052
COUNTY: **JOHNSON**
LATITUDE: **32.351478000** LONGITUDE: **-97.192942000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=518636&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2019-06-18**
DRILLING DATE (COMPLETED): **2019-06-18**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **100'**
WATER LEVEL DATE: **2019-06-18**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **AFFORDABLE WATER WELL**
COMPANY ADDRESS: **P.O. BOX 1322**
BRIDGEPORT, TX 76426

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 14 **Distance from Property: 0.35 mi. ESE**

TRACK #: **567360**
DATE ENTERED: **2021-02-25**
OWNER NAME: **LARIZ FAMILY HOMES**
OWNER ADDRESS: **340 ALLENWOOD DR**
FORT WORTH, TX 76134
COUNTY: **JOHNSON**
LATITUDE: **32.352042000** LONGITUDE: **-97.192575000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=567360&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2021-02-08**
DRILLING DATE (COMPLETED): **2021-02-08**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **2021-02-08**
TYPE OF WATER: **POTABLE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING**
COMPANY ADDRESS: **12775 N SAGINAW BLVD**
FORT WORTH, TX 76179

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 15 **Distance from Property: 0.36 mi. E**

TRACK #: **191303**
DATE ENTERED: **2009-08-26**
OWNER NAME: **J.D. MEADOWS**
OWNER ADDRESS: **8113 QUAIL TRAIL**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.353056000** LONGITUDE: **-97.191945000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=191303&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2006-04-14**
DRILLING DATE (COMPLETED): **2006-04-14**
DEPTH DRILLED: **35'**

WATER LEVEL:
STATIC LEVEL: **40'**
WATER LEVEL DATE: **2006-04-14**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **JIMMY D. MILLER**
COMPANY ADDRESS: **184 CR 3131**
DECATUR, TX 76234

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 15 **Distance from Property: 0.36 mi. E**

TRACK #: **557789**
DATE ENTERED: **2020-10-29**
OWNER NAME: **ANTLER HOME BUILDERS LLC**
OWNER ADDRESS: **P. O. BOX 270285**
FLOWER MOUND, TX 75027
COUNTY: **JOHNSON**
LATITUDE: **32.353314000** LONGITUDE: **-97.191913000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=557789&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-10-15**
DRILLING DATE (COMPLETED): **2020-10-15**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

TEXAS WATER DEVELOPMENT BOARD GROUNDWATER DATABASE (TWDB)

MAP ID# 16 **Distance from Property: 0.37 mi. WSW**

STATE ID:	**32-47-108**
OWNER'S NAME:	**JOHNSON COUNTY SUD**
DATE DRILLED:	**07/00/1981**
DEPTH DRILLED:	**1660'**
WATER USAGE:	**PLUGGED OR DESTROYED**
LONGITUDE:	**-97.214767000**
LATITUDE:	**32.347731000**
SOURCE:	**TWDB**
DOCUMENT LINK:	**http://s3.amazonaws.com/wellpdfs/documents/3247108/3247108.pdf**

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer(s) Twin Mountains (312) Project No. _____ State Well No. 32-47-108

Field No./Owner's Well No. 3 County Johnson

1. Location: ___ ¼, ___ ¼, Section ___, Block ___, Survey ___, Lat. 32-20-52, Long. 97-42-53

2. Owner: Johnson Co. Rural W.S.C. Address: P.O. Box 506, Cleburne, Tx. 76031

Tenant (other): _____ Address: _____

Driller: J.L. Myers Co. Address: 8325 Forney Rd. Dallas, Tx. 75227

3. Land Surface Elevation: 759 ft. above msl determined by Topo

4. Drilled: July 19 81; Dug, Cable Tool (Rotary) Air, ____

5. Depth: Rept. 1682 ft. Meas. ____ ft.

6. Borehole Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed

7. Pump: Mfr. Pleuger Type Turbine

No. Stages 9, Bowls Diam. ____ In., Setting 1144 ft.

Column Diam. ____ In., Length Tailpipe ____ Ft.

8. Motor: Mfr. ____ Fuel elec HP. 125 *

9. Yield: Flow ____ gpm, Pump 300 gpm, Meas., Rept., Est. ____ Date ____

10. Performance Test: Date ____ Length of Test ____ Made by ____

Static Level ____ ft. Pumping Level ____ ft. Drawdown ____ ft.

Production 300 gpm Specific Capacity ____ gpm/Ft.

11. Quality: (Remarks on taste, odor, color, etc.) ____

Analyses

Date 12-12-81 Laboratory Pope TDS 804 Sp Cond 950

Date ____ Laboratory ____ TDS ____ Sp Cond ____

12. Other data available (as circled): (Pumping Test) Power & Yield Test (Drillers Log)

Formation Samples (Geophysical Logs) (type)

13. Water Level(s): 846 ft. rept. meas. Aug 19 81 above (below) LSD which is ____ ft. above (below) Land Surface

1452 ft. rept. meas. Jan 19 85 above (below) ____ which is ____ ft. above (below) Land Surface

14. Use: Dom., Stock, Public Supply, Ind., Irr., Observation, Other (Test Hole, Oil Test, etc.) ____

15. Recorded by: ____ Source of data: ____ Date: ____

16. Remarks: * Replaced 200 h.p. pump which failed on 11-5-82

Reduced in oct. 1984

17. Location or Sketch:

CASING, BLANK PIPE & WELL SCREEN Cemented From 0 ft. to 1460 ft.

Diam. (in.)	Type	Setting (Feet) From	to
24	Steel	0	30
16	"	+2	1458
10¾	Blank Liner S.S.	1350	1448
10¾	Screen	1448	1498
10¾	Blank	1498	1550
"	Screen	1550	1574
"	Blank	1574	1590
"	Screen	1590	1610
"	Blank	1610	1616
"	Screen	1616	1650
"	Blank	1650	1660

TWDB-0308 (Rev. 12-11-85)

W/L Obs. Well ___ W/Q Obs. Well ___

State Well No. 32-47-108

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 32-47-18
Located on map
Received:

1) OWNER JOHNSON COUNTY RURAL W.S.C. #3 (Name) Address (Street or RFD) ALVARADO, TEXAS (City) (State) (Zip)

2) LOCATION OF WELL: County JOHNSON 3.8 miles in south (N.E., S.W., etc.) direction from Alvarado (Town)
on Old Alvarado Highway.

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ____ Block No. ____ Township ____
Abstract No. ____ Survey Name ____
Distance and direction from two intersecting section or survey lines ____
☒ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☒ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ____

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ____

6) WELL LOG:
Date drilled July, 1981

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
	Surface	
SEE ATTACHED		

From (ft.)	To (ft.)	Description and color of formation material
SEE ATTACHED		

(Use reverse side if necessary) 2[illegible]

7) BOREHOLE COMPLETION: ☐ Open Hole ☐ Straight Wall ☒ Underreamed ☐ Gravel Packed ☐ Other ____
If Gravel Packed give interval . . . from ____ ft. to ____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
		SEE ATTACHED			

CEMENTING DATA
Cemented from ____ ft. to ____ ft.
Method used ____
Cemented by ____ (Company or Individual)

9) WATER LEVEL:
Static level ____ ft. below land surface Date ____
Artesian flow ____ gpm. Date ____

10) PACKERS: Type Depth

11) TYPE PUMP: ☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

12) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ____ Depth of strata ____
Was a chemical analysis made? ☐ Yes ☐ No

13) WELL TESTS: ☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

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

NAME JOE W. DILLARD (Type or Print) Water Well Drillers Registration No. 265

ADDRESS 8125 Forney Rd. (Street or RFD) Dallas, Texas 75227 (City) (State) (Zip)

(Signed) [signature] (Water Well Driller) J. L. MYERS COMPANY (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. 32-47-108 X

TDWR-0292 (Rev. 1-12-78) DEPARTMENT OF WATER RESOURCES COPY

RECORD OF WATER WELL AND PUMP
FOR
JOHNSON COUNTY RURAL WATER SUPPLY CORP.

WELL NO. 3 (1981)

DATE:	DECEMBER, 1981
ENGINEER:	CHILDRESS AND RECER 128 S. RIDGEWAY DR. CLEBURNE, TEXAS 76031 1-817-645-9661
WELL CONTRACTOR:	J. L. MYERS COMPANY 8325 FORNEY RD. DALLAS, TEXAS 75227 1-214-388-7407

32-47-108 X

WELL NO. 3 (1981)

J. L. MYERS COMPANY
DALLAS

DRILLER'S LOG

OWNER : JOHNSON COUNTY RURAL WATER SUPPLY CORPORATION

LOCATION : 3.8 MILES SOUTH OF ALVARADO ON OLD ALVARADO HIGHWAY

DRILLED BY: J.L. MYERS COMPANY

DRILLER : LES BERNARD JOE RAULSTON

COMPLETED : 1981

DEPTH OF STRATA From	To	EACH STRATUM Amount	FORMATION
0	2	2	Top soil
2	120	118	Yellow clay
224	354	130	Sand, clay streaks
354	610	256	Lime and shale
610	720	120	Sand
720	818	98	Shale and sand
818	962	144	Shale and lime streaks
962	1015	53	Sand
1015	1120	105	Shale, sand and lime streaks
1120	1470	350	Lime, shale and sand streaks
1470	1682	212	Sand, shale streaks

32-47-108 X

INCLINATION SURVEY
FOR

JOHNSON COUNTY RURAL WATER SUPPLY CORP.
WELL NO. 3 (1981)

INTERVAL		DEGREE
FROM	TO	
0	120	1/4
120	148	1/4
148	177	1/4
177	205	1/2
205	234	1/2
234	262	1/4
262	292	1/4
292	323	1/4
323	354	1/8
354	385	1/8
385	417	-0-
417	508	3/4
508	539	1/4
539	570	1/2
570	631	1/4
631	662	1/2
662	747	1/2
747	786	3/4
786	849	1/2
849	942	1/2
942	975	1/4
975	1006	1/4
1006	1069	1/2
1069	1131	1/4
1131	1193	-0-
1193	1225	1/8
1225	1349	1/2
1349	1493	1/2
1493	1568	1/2

32-4710B X

RAILROAD COMMISSION TEXAS
OIL AND GAS DIVISION

AUG 31 1981

Form W - 15
(Rev. 5-1-80)

CEMENTING REPORT

*1. Field Name (as per RRC Records or Wildcat)	*2. RRC District
*3. Operator J. L. MYERS	*4. County JOHNSON
*5. Lease Name(s) and RRC Lease Number(s) or I. D. Number(s) JOHNSON COUNTY COOP.	*6. Well Number #21
*7. Location (Section, Block, and Survey)	

CASING CEMENTING DATA	SURFACE CASING	INTERMEDIATE CASING	PRODUCTION CASING Single String	PRODUCTION CASING Multiple Parallel Strings	MULTI-STAGE CEMENTING PROCESS Tool	MULTI-STAGE CEMENTING PROCESS Shoe
8. Cementing Date	8-26-81					
*9. (a) Size of Drill Bit (inches)						
(b) Estimated % Sack or Hole Enlargement Used in Calculations						
*10. Size of Casing (inches O.D.)						
*11. Top of Liner (if liner used) (ft.)						
*12. Setting Depth of Casing (ft.)						
13. Type API Class Cement & Amount of Additives Used (a) in First (Lead) or Only Slurry (if additional space is needed, use "REMARKS" on reverse side.)	Remarks					
(b) in Second Slurry	Remarks					
(c) in Third Slurry						
14. Sacks of Cement Used (a) in First (Lead) or Only Slurry	925					
(b) in Second Slurry	100					
(c) in Third Slurry						
(d) Total Sacks of Cement Used	1025					
15. Slurry Volume per Sack of Cement (cu.ft./sack) (a) in First (Lead) or Only Slurry	1.53					
(b) in Second Slurry	1.06					
(c) in Third Slurry						
16. Volume of Slurry Pumped (cu. ft.) (Item 14 x Item 15) (a) in First (Lead) or Only Slurry	1415.25					
(b) in Second Slurry	106					
(c) in Third Slurry						
(d) Total Slurry Volume Pumped (cu.ft.)						
17. Calculated Annular Height of Cement Slurry behind Pipe (ft.)	surface					
18. Was cement circulated to ground surface (or bottom of collar) outside casing? (Yes or No)	YES					
CEMENTING TO PLUG AND ABANDON DATA:	PLUG NO. 1	PLUG NO. 2	PLUG NO. 3	PLUG NO. 4	PLUG NO. 5	PLUG NO. 6
19. Cementing Date						
*20. Size of Hole or Pipe in which Plug Placed (inches)						
*21. Depth to Bottom of Tubing or Drill Pipe (ft.)						
22. Sacks of Cement Used (each plug)						
23. Slurry Volume Pumped (cu. ft.)						
24. Calculated Top of Plug (ft.)						
*25. Measured Top of Plug (if tagged) (ft.)						

(CEMENTING COMPANY AND OPERATOR MUST COMPLY WITH THE INSTRUCTIONS ON REVERSE SIDE HEREOF.)

— OVER —

* Designates items to be completed by Operator. Items not so designated shall be completed by Cementing Company.

32-47-108

26. Remarks:

1. 9 Sks. Reg 50/50 Poz, 6% Gel
2. 100 Sks. Reg. H Neat

27. Remarks:

CEMENTING COMPANY

I declare under penalties prescribed in Article 6252-9, V. C. S., that I am authorized to make this certification; that the cementing of casing and/or the plugging of cement given in the well as shown in the report was performed by me or under my supervision, and that the cementing data and facts presented on both sides of this form are true, correct, and complete to the best of my knowledge. This certification covers cementing data only.

Signature of Cementer or Authorized Representative

W. F. WILLIS CEMENTER

Name of Person and Title (type or print)

HALLIBURTON SERVICES

Cementing Company

P. O. BOX 204

Street Address or P.O. Box

KENNEDALE, TX 76601

City, State Zip Code

Telephone 817 965-4500

Area Code

8-26-87

Date

*OPERATOR

I declare under penalties prescribed in Article 6252-9, V. C. S., that I am authorized to make this certification; that I have knowledge of the well data and information presented in this report, and that data and facts presented on both sides of this form are true, correct, and complete to the best of my knowledge. This certification covers all well data and information presented herein.

*Signature of Operator or Authorized Representative

*Name of Person and Title (type or print)

*Operator

*Street Address or P.O. Box

*City, State Zip Code

*Telephone Area Code

*Date

INSTRUCTIONS

1. A. This form shall be filed by the operator in the RRC District Office with:
   (1) Each copy of an initial Form G-1 or W-2 if a cementing report is required by Statewide or Special Rules, or if exception is needed to cementing requirements in Statewide or Special Rules, unless the Form G-1 or W-2 is signed by the cementing company representative.
   (2) Each copy of Form W-3 unless the Form W-2 is signed by the cementing company representative.
   (3) Each copy of Form W-4 if a multiple parallel casing completion.
   B. At least an original and one copy of this form shall be filed for each cementing company used on a well.
   C. The cementing of different casing strings on a well by one cementing company may be consolidated on one form (to be filed in duplicate).
2. Cementing Company and Operator shall comply with the applicable portions of Statewide Rules 8, 13, and 14. For offshore operations, Cementing Company and Operator shall comply with Statewide Rule 13(E).
3. If setting FULL AMOUNT OF SURFACE CASING:
   A. Depth to protect fresh water by:
      (1) Field Rule
      (2) Texas Water Development Board, if no Field Rule
   B. Set surface casing below depth to be protected and cement from casing shoe to ground surface.
4. IF SETTING ANYTHING OTHER THAN THE FULL AMOUNT OF SURFACE CASING, PERMISSION SHALL BE OBTAINED FROM THE RAILROAD COMMISSION.
5. If setting NO SURFACE CASING (See item 4 above):
   A. If no multi-stage tool is used, the next deeper casing string shall be cemented from the casing shoe to the surface.
   B. If using the multi-stage tool as the next deeper string, cement from the depth that protects fresh water needs to the surface.
6. If setting SHORT SURFACE CASING (See item 4 above):
   A. Cement short surface casing from the shoe to the surface.
   B. Whether the multi-stage tool is or is not used on the next deeper casing string, cement from the depth that protects fresh water needs to
      (1) the surface, or
      (2) a point midway between shoe of surface string and the surface. Compliance will be considered if a temperature survey shows that the top of the cement is at least one-third of the distance from the shoe of the surface string to the surface.
7. Setting PRODUCTION STRING of Casing: (Statewide Rules (Special Rules may vary.)
   A. Cement to a point at least 600 feet above the casing shoe.
   B. When 3,000 feet or more of pipe is set for the production or protecting string, a minimum of 20 feet of cement shall be left inside the pipe.
8. PLUGGING AND ABANDONING:
   A. Cement plugs shall be placed in the well bore as required by Rules and Regulations of the Commission governing additional plugs as may be specified by the RRC District Director.
   B. The minimum amount of cement normally used to each plug shall be a slurry volume equal to the amount necessary to fill the calculated volume of 100 feet of the hole in which the plug is placed.
   C. A 10 foot cement plug is required to be placed in the top of the well.

32-47-108 X

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MATERIAL RECORD OF WELL NO. 3
FOR
JOHNSON COUNTY RURAL WATER SUPPLY CORP.

FROM	TO	AMOUNT	DESCRIPTION
0	30	30	24" O.D. 0.25" surface pipe
+2	1458	1460	16" O.D. 62#/ft. 0.375" PE casing with float collar, cemented by Halliburton with 1025 sacks Class H and Poz A with 6% gel.
1350	1468	118	10-3/4" O.D. 40.5#/ft. .350" T&C blank liner
1468	1498	30	10-3/4" O.D. stainless steel wire wrapped "Bar Plus" screen 0.020" opening.
1498	1550	52	10-3/4" blank with centralizer
1550	1574	24	10-3/4" screen
1574	1590	16	10-3/4" blank
1590	1610	20	10-3/4" screen
1610	1616	6	10-3/4" blank with centralizers
1616	1650	34	10-3/4" screen
1650	1660	10	10-3/4" blank - Total Depth
1458	1655	198	20" underreamed hole with Lone Star gravel.

32-47-108 X

JOHNSON COUNTY RURAL WATER SUPPLY CORPORATION
WELL NO. 3 (1981)
RECORD OF PUMPING TEST

TEST DATE:	12-11-81
AIRLINE LENGTH:	1,122 FEET
ORIFICE:	4" x 3"
OPERATOR:	PAUL PARSLEY

32-47-108 X

RECORD
OF
PUMPING TEST
FOR
JOHNSON COUNTY RURAL WATER SUPPLY CORPORATION
WELL NO.3 (1981)

DATE & TIME (hours)	ORIFICE READING (inches)	GPM	AIRLINE READING (feet)	WATER LEVEL (feet)	REMARKS
12-11-81					
0900			276'	846	Few grains sand
1000	33-1/2	244	150	972	Clearing
1100	33	242	145	977	
1200	31	235	128	994	Clearing
1300	30	230	124	998	
1400	31	235	134	988	
1500	31	235	135	987	Clear
1600	31-1/2	236	135	987	
1700	30	230	124	998	
1800	29.5	228	116	956	
1900	29	226	114	1008	
2000	30.5	232	125	997	
2100	30.5	232	126	998	
2200	30	230	120	1002	
2300	28	222	112	1010	
2400	28.5	224	117	1005	
12-12-81					
0100	30	230	124	998	
0200	30.5	232	124	998	
0300	30	230	124	998	
0400	30.5	232	125	997	
0500	30.5	232	124	998	
0600	30	230	124	998	
0700	30	230	124	998	
0800	29	226	109	1013	
0900	29	226	109	1013	PUMP TURNED OFF
RECOVERY BEGINS					
0905			202		
0910			215		
0915			230		
0925			236		

32-47-108 X

DATE & TIME	ORIFICE READING	GPM	TIME READING	WATER LEVEL	REMARKS
RECOVERY CONTINUES					
12-12-81					
0935			244		
0945			256		
1000			271		
1015			286		
1030			297		
1100			310		
1130			322		
1200			330		

32-47-108 X

POPE Testing LABORATORIES, Inc.

CONSULTING ANALYTICAL CHEMISTS
AND TESTING ENGINEERS
P. O. BOX 502
DALLAS, TEXAS 75221

Date Rec'd 12-14-81

To: J L Myers Company
Dallas, Tx

Report of Tests on Water

Received From: You

Identification Marks: Johnson Co. Rural WSC Well No 3 Sampled 12-12-81 S.L. 846' P.L. 1013' @226 gpm After 24 hrs screened 1470-1650'

Values reported are for minerals in solution

	Parts Per Million
Calcium	2.4
Magnesium	0.9
Iron	0.07
Manganese	0.0
Sodium	235.7
Carbonate	19.2
Bicarbonate	429.4
Sulphate	64.0
Chloride	50.9
Fluoride	1.5
Nitrate	0.0
Phenolphthalein Alkalinity as $CaCO_3$	16.0
Total Alkalinity as $CaCO_3$	384.0
Total Hardness as $CaCO_3$	10.0
Dissolved Residue (TS) Calculated	804.1
Specific Conductance Micromhos/cm	950
pH	8.8

DEC 16 1981

RECOMMENDED LIMITS FOR DRINKING WATER (P. P. M.)

Iron	0.3	Fluoride	0.6—1.0
Manganese	0.05	Nitrate	45
Sulphate	250	Total Solids	500
Chloride	250		

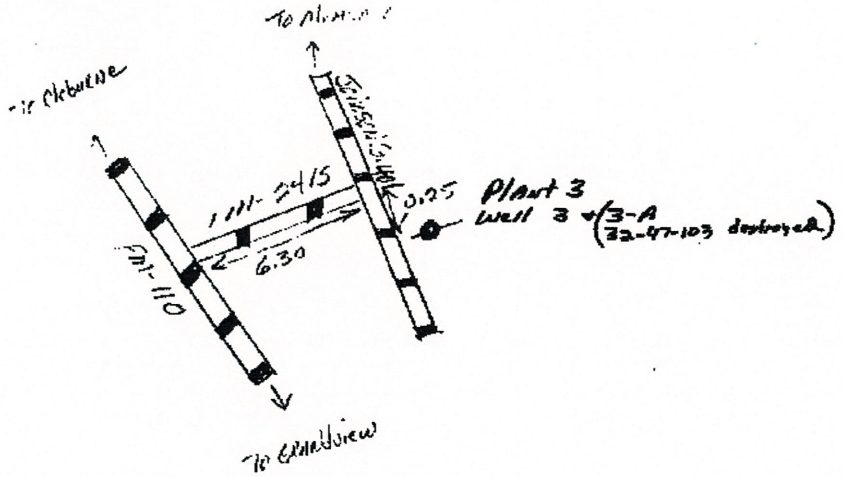
POPE TESTING LABORATORIES, Inc.
By [signature]

Lab. No. 24063

P-150-1M

32-47-108 X

From (ft.)	To (ft.)	Descriptive Term
0	2	soil
2	6	black dirt
6	35	yellow clay
35	60	blue shale
60	75	sandy shale
75	85	sand
85	117	sandy shale
117	160	sand
160	175	sandy shale
175	190	sand
190	220	sandy shale
220	250	sand
250	260	sandy shale
260	720	white rock
720	820	sand
820	1250	lime rock
1250	1300	sandy lime
1300	1420	sand
1420	1475	red bed
1475	1497	sand
1497	1530	red bed
1530	1680	sand



32-47-108

32-47-103

Please use black ink, send original copy by certified mail to the Texas Water Commission P.O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Johnson County W.S. Corp. (Name) Address P.O. Box 506 (Street or RFD) Cleburne (City) TX (State) 76031 (Zip)

2) LOCATION OF WELL: County Johnson 5 miles in S. W. (N.E., S.W., etc.) direction from Alvarado (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

Well Plant 3

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☑ See attached map.

3) TYPE OF WORK (Check): ☐ New Well ☐ Deepening ☑ Reconditioning ☐ Plugging

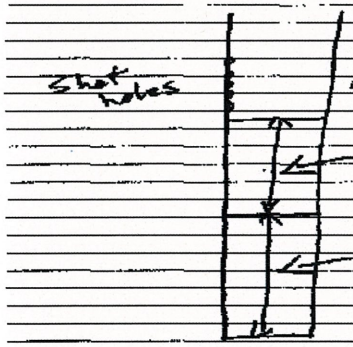
4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Monitor ☑ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) DRILLING METHOD (Check): ☐ Driven ☐ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☑ Other Service

6) WELL LOG:
Date Drilling: Started 11-1 1990 Completed 12-11 1990

DIAMETER OF HOLE Dia. (in.)	From (ft.)	To (ft.)
12	Surface	1640

From (ft.)	To (ft.)	Description and color of formation material
		Changed Trinity well to a pulley well



(Use reverse side if necessary)

7) BOREHOLE COMPLETION: ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☑ Other Cement Sub Shot
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgt., if commercial	Setting (ft.) From	To	Gage Casing Screen
7	U	Steel	0	1640	—
7	U	Steel Shot 35	752	808	
		Shot 18	816	834	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 1640 ft. No. of Sacks Used _____
_____ ft. to _____ ft. No. of Sacks Used _____
Method used _____
Cemented by _____

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☑ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 564 ft. below land surface Date 12-10-90
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth

13) TYPE PUMP: ☐ Turbine ☐ Jet ☑ Submersible ☐ Cylinder ☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 716 ft.

14) WELL TESTS:
Type Test: ☑ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 65 gpm with 87 ft. drawdown after 36 hrs.

RECEIVED
TEXAS WATER BOARD

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☑ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Millican Well SER. (Type or Print) Water Well Driller's License No. 1563

ADDRESS P.O. Box 820 487 (Street or RFD) Ft. Worth (City) Tex (State) 76182 (Zip)

Signed Kenneth D. Millican (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only
Well No. 32-47-1
Located on map _____

C-[illegible] (Rev. 06-10-85) TEXAS WATER COMMISSION COPY

32-47-108

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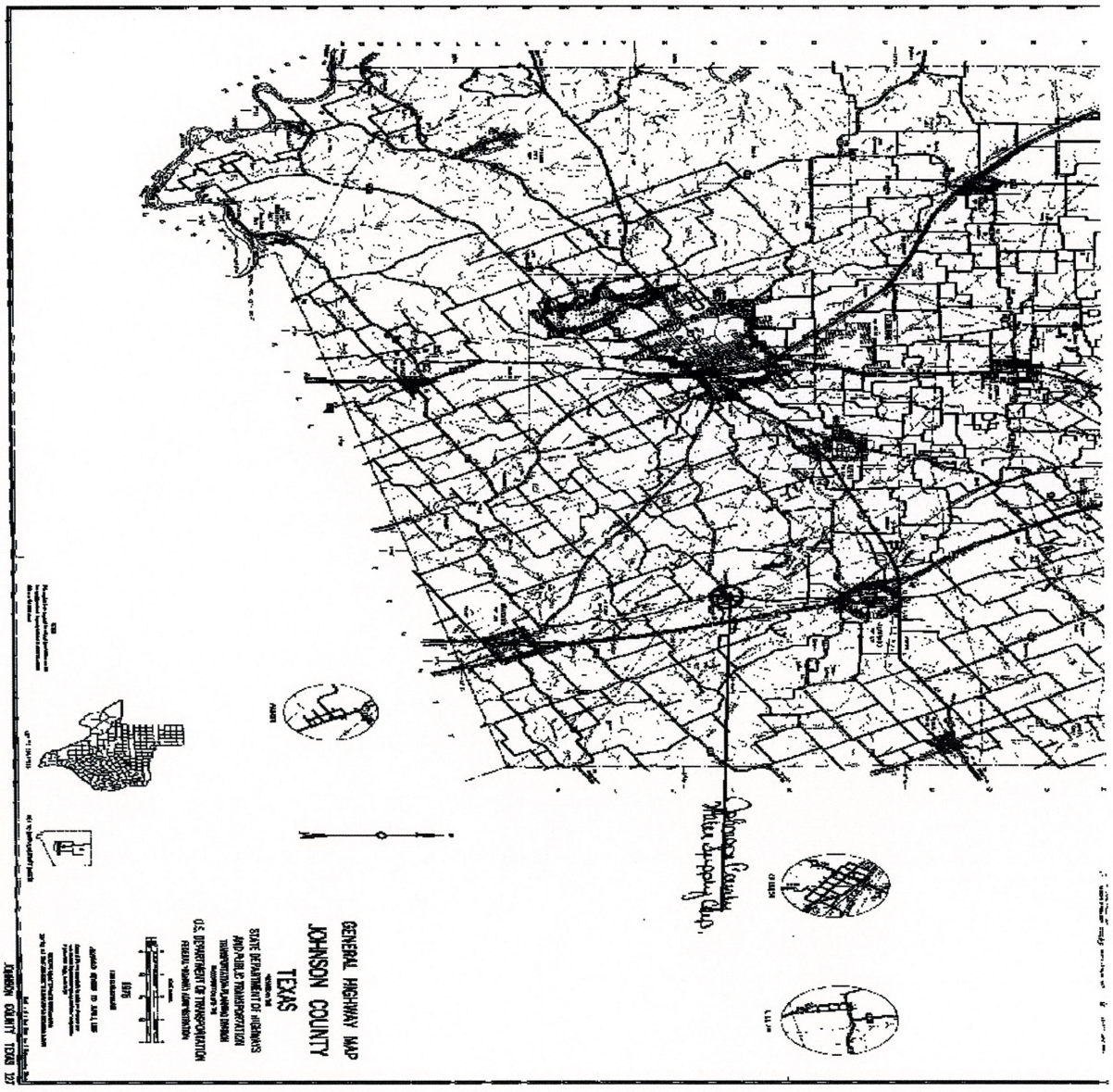

GENERAL HIGHWAY MAP
JOHNSON COUNTY
TEXAS
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION
JOHNSON COUNTY TEXAS

Water Quality Field Data

SWN: 32-47-109
County: Johnson
Aquifer(s): 219 TWMT

Name: Ronnie Nichols
Johnson County Rural WSC
Address: P.O. Box 509
Cleburne, Tx. 76033
owner's well # 3

Sample No. 35-1456-1999
Date: 4/15/99
By: Bryan Smith

Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6	Bottle 7	Total SUB-Samples
500 ml Anions	1 liter Cations	250 ml Nitrate	1 liter Radioactivity				3
	2 ml HNO_3 (Nitric)	0.5 ml H_2SO_4 (Sulfuric)	2 ml HNO_3 (Nitric)				All filtered unless otherwise stipulated

Water Level ___ LSD Remark ___
Temperature (00010) 30.0 c
Specific Conductance (00094) 1013 umhos/cm
pH (00400) 8.65
Eh (00090) 71.6 mv.
Phenol ALK (82244) 10.00 mg/l
Total ALK (39086) 361.00 mg/l
Carbonate (00452) 0.40 meq/l 12.00 mg/l
Bicarbonate (00453) 6.42 meq/l 416.14 mg/l
Total Cations(+) Balanced
Total Anions (-)
Total Hardness (00900) 6
Dissolved Solids 580

Time in 15:00
Time out 16:00 Sample time 15:30
Weather windy + clear well use Public
Outside Temp 62° F
Sampling point Faucet on Discharge

Starting pH 8.64
19.05 ml. of 0.02N to
50 ml. of Sample
Ending pH 4.50

Time:	15:10	15:15	15:20	15:27			ml.	pH	ml.	pH	ml.	pH
pH:	8.59	8.63	8.65				0	8.64	14	5.98	0.50	8.30
Temp:	30.4	30.3	30.0				1	7.86	16	5.64		
Eh:				71.6			2	7.46	17	5.16		
Cond.	1019	1019	1013				3	7.24	18	4.52		
							4	7.07	18.05	4.50		
							5	6.94				
							6	6.83				
							9	6.42				
							10	6.43				
							12	6.22				

other notes:

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

Environmental Laboratory Services
The Solution Lab

FINAL ANALYSIS REPORT

LAB ID: 9906553 SAMPLE DESCRIPTION: Groundwater
COMPANY: TX Water Dev. Board SAMPLE DATE: 04/15/99
ACCT NO: SAMPLE TIME: 1530
REQUISITION No.: R10640 DATE RECEIVED: 04/16/99
LOCATION ID: 32-47-108 REPORT DATE: 05/05/99

PARAMETER	RESULTS	UNITS	STORET #	PQL in WATER	DATE ANALYZED
Bromide	0.21	mg/L	71870	0.02	04/20/99
Chloride	50.2	mg/L	00941	1.5	04/20/99
Fluoride	0.94	mg/L	00950	0.01	04/20/99
Nit.,nitri/nitra-AFA	<0.050	mg/L	00630	0.010	04/29/99
Nitrogen, Kjeldahl	0.563	mg/L	00623	0.040	04/22/99
Nitrogen, ammonia	0.425	mg/L	00608	0.050	04/21/99
Phosphorus, Total	<0.040	mg/L	00665	0.040	04/22/99
Silica	15.89	mg/L	00955	0.50	04/19/99
Sulfate	77.50	mg/L	00946	1.50	04/20/99
Alkalinity, Total	337	mg/L	00410	1	04/20/99
Alkalinity, Phenol.	0	mg/L	00415	0	04/20/99
Boron, Dissolved	442.00	ug/L	01020	50.00	04/19/99
Cobalt, Diss. ICPMS	<1.0	ug/L	01035	1.0	04/20/99
Iron, Dissolved	<50.00	ug/L	01046	50.00	04/19/99
Lithium, Diss. ICPMS	65.1	ug/L	01130	2.0	04/20/99
Molybdenum Dis ICPMS	1.9	ug/L	01060	1.0	04/20/99
Potassium, Dissolved	1.21	mg/L	00935	0.20	04/19/99
Strontium, Dissolved	217.00	ug/L	01080	20.00	04/19/99
Vanadium, Diss ICPMS	4.3	ug/L	01085	1.0	04/20/99
Aluminum, Dis. ICPMS	5.0	ug/L	01106	4.0	04/20/99
Arsenic, Diss. ICPMS	<2.0	ug/L	01000	2.0	04/20/99
Barium, Diss. ICPMS	62.1	ug/L	01005	1.0	04/20/99
Cadmium, Diss. ICPMS	<1.0	ug/L	01025	1.0	04/20/99
Calcium, Dissolved	1.74	mg/L	00915	0.20	04/19/99
Chromium, Diss ICPMS	14.6	ug/L	01030	1.0	04/20/99
Copper, Diss. ICPMS	5.6	ug/L	01040	2.0	04/20/99
Lead, Diss. ICPMS	<1.0	ug/L	01049	1.0	04/20/99
Magnesium, Dissolved	0.44	mg/L	00925	0.20	04/19/99
Manganese, Dis ICPMS	2.6	ug/L	01056	1.0	04/20/99
Nickel, Diss. ICPMS	<1.0	ug/L	01065	1.0	04/20/99
Selenium, Dis. ICPMS	<4.0	ug/L	01145	4.0	04/20/99
Sodium, Dissolved	226.00	mg/L	00930	0.20	04/19/99
Antimony, Dis. ICPMS	<1.0	ug/L	01095	1.0	04/20/99
Beryllium, Dis ICPMS	<1.0	ug/L	01010	1.0	04/20/99
Thallium, Diss ICPMS	<1.0	ug/L	01057	1.0	04/20/99
Zinc, Diss. ICPMS	<4.0	ug/L	01090	2.0	04/20/99

Lower Colorado River Authority • P.O. Box 220 • Austin, Texas 78767
3505 Montopolis Drive • Austin, Texas 78744 • (512) 356-6022 • (800) 776-5272 • (512) 356-6021 FAX

TEXAS WATER DEVELOPMENT BOARD GROUNDWATER DATABASE (TWDB)

Page # 18 out of 21
State ID: 32-47-108

2003FY TWDB Water Quality Field Data Sheet

Newly Inventoried Well: N

State Well Number: 32-47-108
County: Johnson
County Code: 251
Aquifer Code: 128 TWMT
Aquifer Id: 28

Name: Johnson Rural Co. WSC
Address: P.O. Box 509
Cleburne, TX 76033
Phone Number:
Attention: Ronnie Nicoles
Well Name or #: 3

Sample ID Number: 985
Date: 7-8-03
Sampler(s): C. Muller

CIRCLE EACH SAMPLE FRACTION COLLECTED:				
1	2	3	4	5
500ml (filtered)	500ml (filtered)	250ml (filtered)	40 ml (unfiltered)	1L (unfiltered)
Anions / Total Alk.	**Cations**	**Nitrate**	**Atrazine**	**Tritium**
Ice	Nitric (HNO_3)	Ice + H_2SO_4	Ice and in dark	

Proper preservation requires adding enough of the correct acid to each sample fraction to bring the pH below 2.0.

Calibration Verification Readings

pH	7 =	7.00
	4 or 10 =	10.09
SLP = 57.9	7.38 =	7.41
Conductivity	500 =	501
	1000 =	1008
	2000 =	2000
	5000 =	5000

Time In: 10:48
Time Out: 11:21

W. L. depth from LSD (ft.):
W.L. remark:
M.P. =

Pumping Since: POA
Sampling Point: FAW

Well Use: P
Lift: S
Power: E

FIELD G.P.S. readings
Latitude: 32° 20' 51.8"
Longitude: 97° 12' 53.2"

Casing Type:
Casing Size: "

Sample Time: 11:05
Filter pressure: hand pump / line

Field Alkalinity Titration:

8.53	Start pH	4.50	End pH
50.0	mL Sample Size		
0.85	mL Acid added for Phenol (> 8.3)		
~~18.10~~ 17.25	mL Acid added for Total (8.3 - 4.5)		

Items below calculated from: mL acid added x 20 = Alkalinity

Phenol Alkalinity (82244): 0 mg/L
Total Alkalinity (39086): ~~345~~ mg/L 362

18.10

Items Below Calculated Later From Results:
Dissolved Solids (mg/L): 581
Hardness (as $CaCO_3$): 6
Balanced: ✓

Water Quality Stabilization Parameters Table (at least 3 readings at five minute intervals)

Time:	10:55	11:00	11:05				
pH:	8.48	8.55	8.55				
Celsius Temp. (00010):	32.5	32.5	32.6				
Conductivity (uS/cm):	1000	1003	1003				

Notes: Nitrate results contaminated sample

Data Entered By Sampler Into Database: yes / no

v:\HEMon\Grndwat\WaterQuality\WQFieldDataSheet2003.xls

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

IIIG-A-55

LCRA Environmental Laboratory Services

Date: *31-Jul-03*

CLIENT: Texas Water Development Board
Client Sample ID: 32-47-108
Lab Order: 0307153 **File No:** 25384
Project: TWDB FY03
Collection Date: 7/8/2003 11:05:00 AM
Lab ID: 0307153-05
Matrix: GROUNDWATER

Analyses	Storet	Result	Qual	PQL	Units	DF	Batch ID	Date Analyzed
ICP METALS DISSOLVED		**E200.7**						Analyst: **MLP**
Calcium		1.63		0.20	mg/L	1	20878	7/25/2003 2:50:38 PM
Magnesium		0.47		0.20	mg/L	1	20878	7/25/2003 2:50:38 PM
Potassium		1.16		0.20	mg/L	1	20878	7/25/2003 2:50:38 PM
Sodium		235		0.70	mg/L	1	20878	7/25/2003 2:50:38 PM
ICP METALS DISSOLVED		**E200.7**						Analyst: **MLP**
Boron		412		50	µg/L	1	20887	7/25/2003 2:50:38 PM
Iron		ND		50	µg/L	1	20887	7/25/2003 2:50:38 PM
Strontium		184		20	µg/L	1	20887	7/25/2003 2:50:38 PM
ICPMS DISSOLVED METALS		**E200.8**						Analyst: **SW**
Aluminum		6.32		4.00	µg/L	1	20699	7/15/2003
Antimony		ND		1.00	µg/L	1	20699	7/15/2003
Arsenic		ND		2.00	µg/L	1	20699	7/15/2003
Barium		61.0		1.00	µg/L	1	20699	7/15/2003
Beryllium		ND		1.00	µg/L	1	20699	7/15/2003
Cadmium		ND		1.00	µg/L	1	20699	7/15/2003
Chromium		5.82		1.00	µg/L	1	20699	7/15/2003
Cobalt		ND		1.00	µg/L	1	20699	7/15/2003
Copper		3.88		1.00	µg/L	1	20699	7/15/2003
Lead		ND		1.00	µg/L	1	20699	7/15/2003
Lithium		56.6		2.00	µg/L	1	20699	7/15/2003
Manganese		3.01		1.00	µg/L	1	20699	7/15/2003
Molybdenum		1.80		1.00	µg/L	1	20699	7/15/2003
Nickel		ND		1.00	µg/L	1	20699	7/15/2003
Selenium		ND		4.00	µg/L	1	20699	7/15/2003
Thallium		ND		1.00	µg/L	1	20699	7/15/2003
Vanadium		1.66		1.00	µg/L	1	20699	7/15/2003
Zinc		ND		4.00	µg/L	1	20699	7/15/2003
CATION/ANION BALANCES		**CALCULATION**						Analyst: **WM**
Cation/Anion Balance		Balanced		0	Date	1	20929	7/30/2003
ANIONS BY ION CHROMATOGRAPHY, DISSOLVE		**E300**						Analyst: **WR**
Bromide Dissolved		0.20		0.02	mg/L	1	20748	7/17/2003 4:22:07 PM
Chloride Dissolved		47.4		5.00	mg/L	5	20724	7/17/2003 1:45:00 AM
Fluoride Dissolved		0.80		0.05	mg/L	5	20724	7/17/2003 1:45:00 AM
Sulfate Dissolved		67.4		5.00	mg/L	5	20724	7/17/2003 1:45:00 AM
ALKALINITY		**M2320 B**						Analyst: **CMM**
Alkalinity, Phenolphthalein		16		0	mg/L CaCO3	1	20709	7/15/2003
Alkalinity, Total (As CaCO3)		353		2	mg/L CaCO3	1	20709	7/15/2003

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		

Page 9 of 28

LCRA Environmental Laboratory Services

Date: *31-Jul-03*

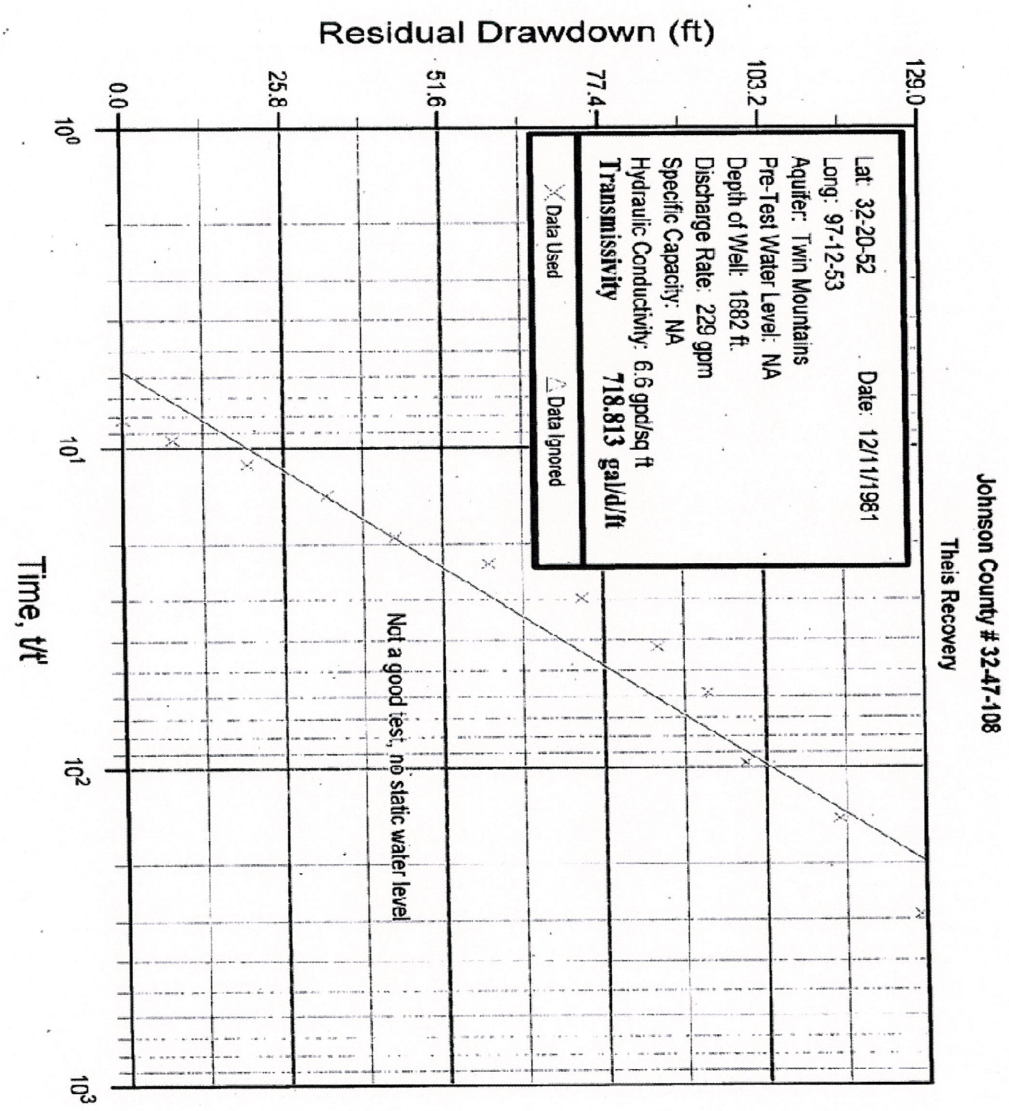
CLIENT: Texas Water Development Board
Lab Order: 0307153 **File No:** 25384
Project: TWDB FY03
Lab ID: 0307153-05

Client Sample ID: 32-47-108
Collection Date: 7/8/2003 11:05:00 AM
Matrix: GROUNDWATER

Analyses	Storet	Result	Qual	PQL	Units	DF	Batch ID	Date Analyzed
NITRATE AND NITRITE	no det 9		E353.2					Analyst: WM
Nitrogen, Nitrate & Nitrite	27 5/2-10 3			0.40	mg/L	20	20756	7/18/2003
SILICA			E370.1					Analyst: WM
Silica, Dissolved (as SiO2)		15.7		0.50	mg/L	1	20795	7/21/2003

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits		


Residual Drawdown (ft)
0.0
25.8
51.6
77.4
103.2
129.0
Time, t/t'
10^0
10^1
10^2
10^3
Johnson County # 32-47-108
Theis Recovery
Lat: 32-20-52
Long: 97-12-53
Date: 12/11/1981
Aquifer: Twin Mountains
Pre-Test Water Level: NA
Depth of Well: 1682 ft.
Discharge Rate: 229 gpm
Specific Capacity: NA
Hydraulic Conductivity: 6.6 gpd/sq ft
Transmissivity 718.813 gal/d/ft
Data Used
Data Ignored
Not a good test, no static water level

WATER UTILITY DATABASE (WUD)

MAP ID# 16 **Distance from Property: 0.37 mi. WSW**

PWSID:	**1260018**
SOURCE ID:	**G1260018D**
UTILITY NAME:	**JOHNSON COUNTY SUD**
DATE DRILLED:	**08/26/1981**
SCREEN BOTTOM:	**0.00'**
SCREEN TOP:	**0.00'**
GALLONS PER MINUTE:	**15**
WELL STATUS:	**ACTIVE**
WATER USAGE:	**ACTIVE - PERMANENT**
CCN:	**10081**
LONGITUDE:	**-97.214766670**
LATITUDE:	**32.347730560**
OWNER'S NAME:	**JOHNSON COUNTY SUD**
ADDRESS:	**PO BOX 1390**
CITY:	**JOSHUA** STATE: **TX** ZIP CODE: **76058-1390**

WATER UTILITY DATABASE (WUD)

MAP ID# 16 **Distance from Property: 0.37 mi. WSW**

PWSID:	**1260018**
SOURCE ID:	**G1260018C**
UTILITY NAME:	**JOHNSON COUNTY SUD**
DATE DRILLED:	**12/11/1990**
SCREEN BOTTOM:	**834.00'**
SCREEN TOP:	**752.00'**
GALLONS PER MINUTE:	**305**
WELL STATUS:	**ACTIVE**
WATER USAGE:	**ACTIVE - PERMANENT**
CCN:	**10081**
LONGITUDE:	**-97.214766670**
LATITUDE:	**32.347730560**
OWNER'S NAME:	**JOHNSON COUNTY SUD**
ADDRESS:	**PO BOX 1390**
CITY:	**JOSHUA** STATE: **TX** ZIP CODE: **76058-1390**

UNITED STATES GEOLOGICAL SURVEY NATIONAL WATER INFORMATION SYSTEM (NWIS)

MAP ID# 16 **Distance from Property: 0.37 mi. WSW**

REPORTING AGENCY: **US GEOLOGICAL SURVEY**
SITE NUMBER: **322051097125301**
STATION NAME: **PX-32-47-103**
SITE TYPE: **GW**
LATITUDE: **32.347730560** LONGITUDE: **-97.214766700**
DATE DRILLED: **NOT REPORTED**
WELL DEPTH: **1640 feet**
HOLE DEPTH: **NOT REPORTED**
LOCAL AQUIFER: **PALUXY SAND**

TEXAS WATER DEVELOPMENT BOARD GROUNDWATER DATABASE (TWDB)

MAP ID# 16 **Distance from Property: 0.37 mi. WSW**

STATE ID:	**32-47-103**
OWNER'S NAME:	**JOHNSON COUNTY SUD**
DATE DRILLED:	**10/00/1966**
DEPTH DRILLED:	**840'**
WATER USAGE:	**PUBLIC SUPPLY**
LONGITUDE:	**-97.214767000**
LATITUDE:	**32.347731000**
SOURCE:	**TWDB**
DOCUMENT LINK:	**http://s3.amazonaws.com/welipdfs/documents/3247103/3247103.pdf**

WRD Exp. (C
April 1966

PX-32-47-103

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by G. Thompson Source of data Driller Date 10-7-66 Map Grandview

State Texas 42 County (or town) Johnson P X

Latitude: ° min sec N S Longitude: degrees min sec Sequential number:

Lat.-long. accuracy: T. N S. R. E W. Sec. k, k, k

Local well number: 32-47-103 Other number: 32-47-103 B&M

Local use: Owner or name: Johnson Co. Water

Owner or name: Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co., (P) Private, (S) State Agency, (W) Dist N

Use of water: (A) Air cond, (B) Bottling, (C) Comm, Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Ind, (P) P S, (R) Rec, (S) Stock, (Instlr, (U) Unused, (W) Repressure, (Z) Recharge, Dasel-P S, Dasel-other, Other P

Use of well: (A) Anode, (D) Drain, (E) Seismic, (H) Heat Rem, (O) Obs, (O) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdrawn, (X) Waste, (Z) Destroyed

DATA AVAILABLE: Well data Freq. W/L meas.: Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: Pumpage inventory: yes no; period:

Aperture cards: yes

Log data: Electric Gamma log Shewitzer Petro. of Houston

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 1680 ft Meas. (tape) driller accuracy

Depth cased (first perf.): 1562 ft Casing type: Steel Diam. 7-7/8 in

Finish: (G) perforated concrete, (F) gravel w. (perf.), (H) gravel w. screen, (K) bailed, gallery, etc., (O) open hole, (Y) perf, (S) screen, sl. pc., (T) shored, (W) pack mats, (X) other (B) P

Method Drilled: (A) air rot, (B) bored, cable, (C) dug, (D) hyd rot, (J) jetted, (P) air percussion, rotary, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, other (B) H

Date Drilled: 9/30/66 Pump intake setting: 758 ft

Driller: C. M. Stowe

Life (type): (A) air, (B) bucket, cent, jet, (C) multiple (cent.), (L) multiple, (M) (turb.), (N) none, (P) piston, rot, (S) submerg, (T) turb, other Address Deep Shallow

Power (type): diesel, (elec) gas, gasoline, hand, gas, wind; H.P. Trans. or meter no.

Descrip. MP RT 4 ft above LSD, Alt. MP 763+

Alt. LSD: 759 Accuracy (source) Topo Map

Water level 543 ft above below MP; ft above below LSD Accuracy: driller

Date meas: 10/24/66 Yield: 80 TR gpm Method determined

Drawdown: ft Accuracy: Pumping period 24 hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Obs Well

Q-23

Well No. PX-32-47-103

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Well No. PX 47-103

Latitude-longitude N S d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: Section:

Drainage Basin: Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat U

MAJOR AQUIFER: system series Hosston Fm aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened: Perf: 1562-1582, 1600-1608, 1630-1646, 1656-1660, 1664-1672 (56 ft Perf.)

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: 0.6 gpm/ft; Number of geologic cards:

System not in operation at end of 1966.

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDB ONLY
Organization No. 422 Lab No. 01
Work No. 6042 TAC-(86-87) 1585

CHEMICAL WATER ANALYSIS REPORT

Send Reply To:
Water Availability Data and Studies Section
Texas Water Development Board
Stephen F. Austin Building
1700 Congress Ave.
Austin, Texas 78711
Attn: E. Bilberry Rm. 309 D ERS

County 126 Johnson
State Well No. 32-47-103 Well No. 3
Date Collected 07-29-87

Owner Johnson Co. Rural W.S.C. ✓ Send copy to owner Sample No. By E. Bilberry
Address P.O. Box 506 Cleburne, TX. 76031 Well Location
Date Drilled 10-1-66 Depth 1680 ft. WBF Tom-312 Source (type of well) Subm.
Producing intervals Water level ft. Sample depth ft.
Sampled after pumping 5 min. hrs. Yield GPM Temperature 074 °F °C
Point of collection Disch. pipe Appearance ✓ clear ☐ turbid ☐ colored ☐ other
Use P.S. Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. [redacted] Date Received JUL 31 '87 KEY PUNCHED Date Reported AUG 24 '87

State Well No: 32-47-103 Sample No: CB7-1913

WATER ANALYSIS
Date: 081787

	MG/L	ME/L		MG/L	ME/L
Silica: 00955:	10		Carbonate: 00445:	12	0.40
Calcium: 00915:	2	0.14	Bicarbonate: 00440:	394	6.46
Magnesium: 00925:	<1	0.04	Sulfate: 00946:	80	1.67
Sodium: 00930:	232	10.09	Chloride: 00940:	53	1.49
Potassium: 00935:	1.0	0.03	Fluoride: 00950:	0.7	0.04
T. Cations		10.29	Nitrate as NO3: 71851:	<0.04	0.00
Manganese: 01055:		%Na	T. Anions		10.04
Boron: 01020:		SAR	pH: 00403:	8.7	
Total Iron: 01045:		RSC	TDS(Calc): 70301:	586	
Other			P. Alk.: 00415:	10	
(Specific Cond.: 00095:	844		T. Alk.: 00410:	343	
Diluted Conductance (micromhos/cm3)			T. Hardness: 00900:	9	
7 x150 =1050			Ammonia-N: 00610:		
__ items will be analyzed if checked.			Nitrite-N: 00615:		
			Nitrate-N: 00620:		
			Organic Nitrogen: 00605:		

TWDB-0811 (Rev.02-27-86)

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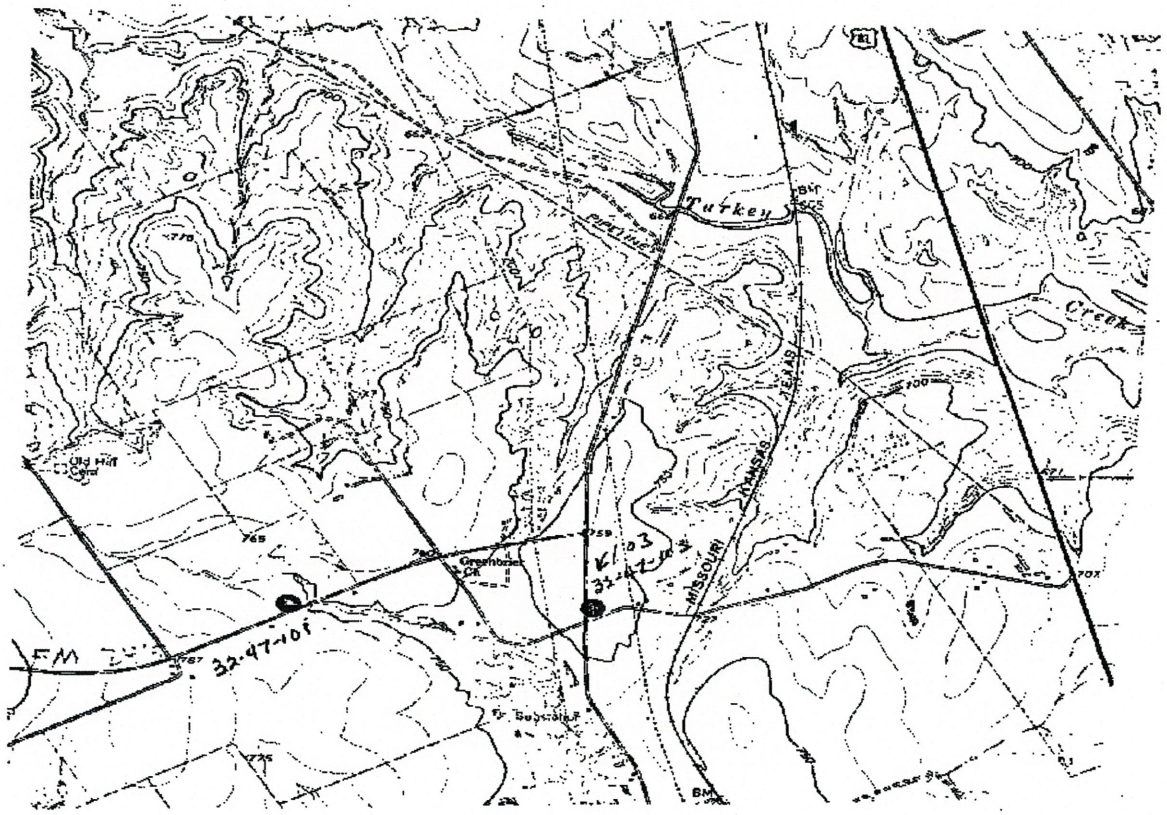
TEXAS WATER DEVELOPMENT BOARD

BY_____ DATE_____ DIVISION _____ SHEET NO._____ OF_____

CHKD_____ DATE_____ JOB NAME _____

_____ JOB NO._____ PROG. CODE _____



TWDBS-S-3

PX 32-47-103 tot

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Lower Twin Mountains Field No. _____ State Well No. 32-47-103

Owner's Well No. #3 County Johnson

1. Location: ___ 1/4, ___ 1/4 Sec. ___, Block ___ Survey ___
   3.5 S. Alvarado
2. Owner: Johnson County RURAL W.S.C. Address: 202 N. Caddo, Cleburne, Tex.
   Tenant: _____ Address: _____
   Driller: Stoner Drilling Co. Address: _____
3. Elevation of LSD is 759 ft. above msl, determined by Topo
4. Drilled: 10-1 1966; Dug, Cable Tool, Rotary
5. Depth: Rept. 1680 ft. Meas. _____ ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed
7. Pump: Mfgr. Red Jacket Type Subm.
   No. Stages ___, Bowls Diam. ___ in., Setting 1000 ft.
   Column Diam. ___ in., Length Tailpipe ___ ft.
8. Motor: Fuel elec. Make & Model _____ HP. 20
9. Yield: Flow ___ gpm, Pump 82 gpm, Meas., Rept., Est.
10. Performance Test: Date 10-66 Length of Test 24 hr. Made by Stoner
    Static Level 558 ft. Pumping Level 623 ft. Drawdown 65 ft.
    Production 82 gpm Specific Capacity 1.3 gpm/ft.
11. Water Level: 558 ft. rept. meas. 10 1966 above below which is ___ ft. above below surface.
    780.0 ft. rept. meas. 12-21 1976 above below AIRLINE 220-105' off which is ___ ft. above below surface.
    ___ ft. rept. meas. 19__ above below which is ___ ft. above below surface.
    ___ ft. rept. meas. 19__ above below which is ___ ft. above below surface.
12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
    Temp. ___ °F, Date sampled for analysis 9-25-75 Laboratory TSDH
    Temp. ___ °F, Date sampled for analysis _____ Laboratory _____
    Temp. ___ °F, Date sampled for analysis _____ Laboratory _____
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Q-23
    Formation Samples, Pumping Test,
15. Record by: G. Davis Date 7-23 1975
    Source of Data Johnson Cty. Rept. W.S.C. + obs
16. Remarks: AIRLINE @ 1000'

CASING & BLANK PIPE
Cemented From 0 ft. to 1680 ft.

Diam. (in.)	Type	Setting, ft. from	to
7	steel	0	1680

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to	# SHOTS
7	Jet Perf.	1562	1582	41
7	"	1600	1608	17
7	"	1630	1646	33
7	"	1656	1660	9
7	"	1664	1672	17

TWDBE-WD-2

BACK (Sketch)

32-47-103

REQUEST FOR CHEMICAL ANALYSIS OF WATER

TEXAS STATE DEPARTMENT OF HEALTH LABORATORIES

1100 WEST 49th STREET AUSTIN, TEXAS 78756

☆ IMPORTANT - READ CAREFULLY -

All requests must be signed by the person requesting the analysis. Chemical analyses are limited to samples of water from public supplies the examination of which is requested by a proper official. If the supply being sampled is of public interest and not presently serving the public, an explanation of the reason for the request for the analysis should be furnished under "Remarks" or by attaching a separate explanatory sheet. Please complete the form with typewriter ribbon or print plainly using soft pencil or black ink. A ball point pen should not be used.

Send report to

JOHNSON County RURAL WATER Supply
207 N. CADDO
CLEBURNE TEXAS 76031

LOCATION Co Rd 1 (Alvarado)
COUNTY JOHNSON
DATE COLLECTED 9-25-75
OWNERSHIP OF SUPPLY:
JOHNSON County RURAL WATER

IF FROM WELL
Depth 1650
Age of Well DRILLED 9 years
Well No. #3

POINT OF COLLECTION
Raw Supply WELLHEAD
Plant Discharge
Distribution
Other

PHYSICAL APPEARANCE
Clear
Turbid
Colored
Odor

IF SURFACE SUPPLY
Name of source

REMARKS:

Signature of Public Official, Water Utility Official, or authorized representative requesting the analysis:

Wade H. Solomon (Signature) Cleburne (Address of Official)

FOR LABORATORY USE ONLY

CHEMICAL ANALYSIS REPORT

(Values reported are for minerals in solution)

Laboratory No. Date Received Date Reported 9/25/75

	Milligrams per Liter		Milligrams per Liter		Milligrams per Liter
Calcium	2.	Carbonate	10	Dissolved solids	780
Magnesium	1	Bicarbonate	411	Phenolphthalein	
Sodium	227	Sulphate	68	Alkalinity as $CaCO_3$	8
Manganese	Insufficient Sample	Chloride	58	Total Alkalinity as $CaCO_3$	353
Iron	0.04	Fluoride	0.6	Total Hardness as $CaCO_3$	10
		Nitrate	<0.1		

pH 8.1 Diluted Conductance Micromhos. cm 1050

32-47-103

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TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer: Lower Trinity Mountains Field No. _____ State Well No. 32-47-103

Owner's Well No. #3 County Johnson

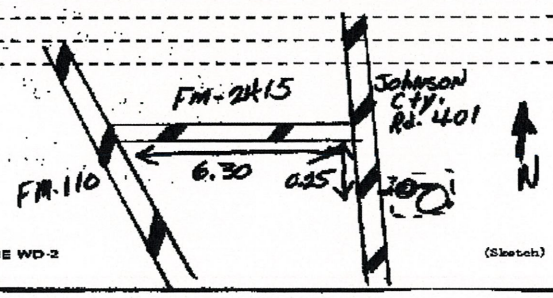
1. Location: ___ 1/4, ___ 1/4 Sec. ___, Block ___ Survey ___
3.5 mi. S. of Alvarado
2. Owner: Johnson County Rural W.S.C. Address: 202 N. Caddo, Cleburne, Tex.
Tenant: _____ Address: _____
Driller: Stoner Drilling Co. Address: Rt. 4, Cleburne, Tex.
3. Elevation of LSD is 759 ft. above msl, determined by Topo
4. Drilled: 10-1- 1966; Dug, Cable Tool, Rotary
5. Depth: Rept. 1680 ft. Meas. ___ ft.
6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed
7. Pump: Mfgr. Red Jacket Type Subm.
No. Stages ___, Bowls Diam. ___ in., Setting 758 ft.
Column Diam. ___ in., Length Tailpipe ___ ft.
8. Motor: Fuel Elect Make & Model ___ HP. 20
9. Yield: Flow ___ gpm, Pump 82 gpm, Meas. Rept., Est.
10. Performance Test: Date 10-66 Length of Test 24 hrs Made by Stoner
Static Level 558 ft. Pumping Level 623 ft. Drawdown 65 ft.
Production 82 gpm Specific Capacity 1.3 gpm/ft.
11. Water Level: 558.0 ft. rept. meas. 10 1966 above below LSD which is ___ ft. above below surface.
___ ft. rept. meas. ___ 19__ above below which is ___ ft. above below surface.
___ ft. rept. meas. ___ 19__ above below which is ___ ft. above below surface.
___ ft. rept. meas. ___ 19__ above below which is ___ ft. above below surface.
12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used,
13. Quality: (Remarks on taste, odor, color, etc.)
Temp. — °F, Date sampled for analysis 9-25-75 Laboratory TSDH
Temp. ___ °F, Date sampled for analysis ___ Laboratory ___
Temp. ___ °F, Date sampled for analysis ___ Laboratory ___
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Q-23
Formation Samples, Pumping Test,
15. Record by: Gene Davis Date 1-23 1975
Source of Data Johnson Cty. Rural W.S.C. + obs.
16. Remarks:

CASING & BLANK PIPE
Cemented From 0 ft. to 1680 ft.

Diam. (in.)	Type	Setting, ft. from	to
7	steel	0	1680

WELL SCREEN
Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
7	Jet Perf. 41 Shots	1562	1582
7	17 shots	1600	1608
7	33 shots	1630	1646
7	9 shots	1650	1660
7	17 shots	1664	1672



TWDBE WD-2 (Sketch) 32-47-103

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GW 7

nd original copy by
ertified mail to the
Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

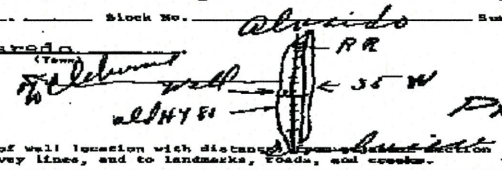
State of Texas

WATER WELL REPORT

For TWDB use only
Well No. [illegible]
Located on map [illegible]
Received: [illegible]
Form GW 8
Form GW 9

1) OWNER:
Person having well drilled Johnson County Water Supply Corporation No. 2 (Name) Address Cleburne, Texas (Street or RFD) (City) (State)
Landowner same (Name) Address same (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County JOHNSON Labor League Abstract No.
NW¼ NE¼ SW¼ SE¼ of Section Block No. Survey
(Circle as many as are known)
miles in 3½ S (NE, SW, etc.) direction from Alvarado (Town)



PX32-47-103

Sketch map of well location with distance from [illegible] section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check): New Well ☒ Deepening ☐ Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check): Domestic ☐ Industrial ☐ Municipal ☒ Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check): Rotary ☒ Driven ☐ Dug ☐ Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 9 7/8 in. Depth drilled 1680 ft. Depth of completed well 1680 ft. Date drilled Oct. 1966
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	2	soil
2	6	black dirt
6	35	yellow clay
35	60	blue shale
60	75	sandy shale
75	85	sand
85	117	sandy shale
117	160	sand
160	175	sandy shale
175	190	sand
190	220	sandy shale
220	250	sand
250	260	sandy shale
260	720	white rock
720	820	sand
820	1250	lime rock
1250-1300		sandy lim
1300-1420		sand
1420-1475		red bed
1475-1497		sand
1497-1530		red bed
1530-1680		sand

(Use reverse side if necessary)

7) COMPLETION (Check): Straight wall ☒ Gravel packed ☐ Other ☐ Under reamed ☐ Open hole ☐

8) WATER LEVEL: Static level 558 ft. below land surface Date Oct.
Artesian pressure lbs. per square inch Date

9) CASING: Type: old ☒ New ☐ Steel ☒ Plastic ☐ Other ☐
Cemented from ~~top~~ 1680 ft. to top ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
7"	0	1680	

10) SCREEN: Type Jet perforated
Perforated ☒ Slotted ☐

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
7"	0	1680	
	1562	1582	41
	1600	1608	17
	1630	1646	33
	1656	1660	9
	1664	1672	17

11) WELL TESTS:
Was a pump test made? ☒ Yes ☐ No If yes by whom? Stoner
Yield: 82 gpm with 623 ft. drawdown after 24 hrs
Bailer test gpm with ft. drawdown after hrs
Artesian flow gpm Date
Temperature of water 90
Was a chemical analysis made? ☒ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☒ No
Type of water? good depth of strata

12) PUMP DATA:
Manufacturer's Name Red Jacket
Type Submersible H.P. 20
Designed pumping rate 82 gpm ☒ gph ☐
Type power unit electric
Depth to bowls, cylinder, jet, etc., 758 ft. below land surface.

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

NAME Stoner Drilling Co. C. M. Stoner (Type or Print) Water Well Drillers Registration No. 17
Address Rt. 4 (Street or RFD) Cleburne (City) Texas (State)
(Signed) C. M. Stoner (Water Well Driller) Stoner Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available. PX32-47-103

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SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 17 **Distance from Property: 0.37 mi. NNE**

TRACK #: **563724**
DATE ENTERED: **2021-01-11**
OWNER NAME: **TYLER BLACK**
OWNER ADDRESS: **8719 I 35 W**
ALVARADO, TX 76004
COUNTY: **JOHNSON**
LATITUDE: **32.365028000** LONGITUDE: **-97.197628000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=563724&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2021-01-05**
DRILLING DATE (COMPLETED): **2021-01-06**
DEPTH DRILLED: **200'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **2021-01-06**
TYPE OF WATER: **TDS 381**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **WALDEN DRILLING INC**
COMPANY ADDRESS: **PO BOX 878**
LLANO, TX 78643

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 18 **Distance from Property: 0.38 mi. ESE**

TRACK #: **576910**
DATE ENTERED: **2021-06-25**
OWNER NAME: **LARIZ FAMILY HOMES**
OWNER ADDRESS: **340 ALLENWOOD DR**
FORT WORTH, TX 76134
COUNTY: **JOHNSON**
LATITUDE: **32.351317000** LONGITUDE: **-97.192453000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=576910&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2021-06-21**
DRILLING DATE (COMPLETED): **2021-06-23**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **2021-06-21**
TYPE OF WATER: **POTABLE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING**
COMPANY ADDRESS: **12775 N SAGINAW BLVD**
FORT WORTH, TX 76179

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 19 **Distance from Property: 0.38 mi. ESE**

TRACK #: **551091**
DATE ENTERED: **2020-08-16**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CRT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.352024000** LONGITUDE: **-97.192002000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=551091&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-08-04**
DRILLING DATE (COMPLETED): **2020-08-04**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 20 **Distance from Property: 0.40 mi. E**

TRACK #: **553611**
DATE ENTERED: **2020-09-10**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWERMOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.353098000** LONGITUDE: **-97.191380000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=553611&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-09-01**
DRILLING DATE (COMPLETED): **2020-09-01**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL

PROPOSED USE:
DOMESTIC

COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 20 **Distance from Property: 0.42 mi. E**

TRACK #: **556034**
DATE ENTERED: **2020-10-12**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.353010000** LONGITUDE: **-97.191033000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=556034&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-10-02**
DRILLING DATE (COMPLETED): **2020-10-02**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 21 **Distance from Property: 0.40 mi. ESE**

TRACK #: **537968**
DATE ENTERED: **2020-03-12**
OWNER NAME: **ANTLER HOMEBUILDERS LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351512000** LONGITUDE: **-97.191928000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=537968&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-03-10**
DRILLING DATE (COMPLETED): **2020-03-10**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 22 **Distance from Property: 0.41 mi. ESE**

TRACK #: **551092**
DATE ENTERED: **2020-08-16**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CRT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.352023000** LONGITUDE: **-97.191414000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=551092&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-08-04**
DRILLING DATE (COMPLETED): **2020-08-04**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 22 **Distance from Property: 0.44 mi. ESE**

TRACK #: **562061**
DATE ENTERED: **2020-12-21**
OWNER NAME: **ANTLER HOMEBUILDERS LLC**
OWNER ADDRESS: **P.O. BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.352001000** LONGITUDE: **-97.190974000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=562061&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-12-08**
DRILLING DATE (COMPLETED): **2020-12-08**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 23 **Distance from Property: 0.42 mi. SW**

TRACK #: **312903**
DATE ENTERED: **2013-03-07**
OWNER NAME: **BOB MAZE**
OWNER ADDRESS: **4341 CR 401**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.346608000** LONGITUDE: **-97.214714000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=312903&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2013-03-04**
DRILLING DATE (COMPLETED): **2013-03-04**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **155'**
WATER LEVEL DATE: **2013-03-04**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **P O BOX 2181**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 24 **Distance from Property: 0.43 mi. ESE**

TRACK #: **34165**
DATE ENTERED: **2004-03-15**
OWNER NAME: **TERRELL SULLIVAN**
OWNER ADDRESS: **8117 QUAIL TRAIL**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.352489000** LONGITUDE: **-97.190922000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=34165&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2004-03-12**
DRILLING DATE (COMPLETED): **2004-03-12**
DEPTH DRILLED: **212'**

WATER LEVEL:
STATIC LEVEL: **90'**
WATER LEVEL DATE: **2004-03-13**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
IRRIGATION
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 25 **Distance from Property: 0.43 mi. ESE**

TRACK #: **537974**
DATE ENTERED: **2020-03-12**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351471000** LONGITUDE: **-97.191322000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=537974&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-03-10**
DRILLING DATE (COMPLETED): **2020-03-10**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 25 **Distance from Property: 0.46 mi. ESE**

TRACK #: **542816**
DATE ENTERED: **2020-05-07**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351465000** LONGITUDE: **-97.190848000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=542816&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-04-15**
DRILLING DATE (COMPLETED): **2020-04-15**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 26 **Distance from Property: 0.45 mi. E**

TRACK #: **562074**
DATE ENTERED: **2020-12-21**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **PO BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.353034000** LONGITUDE: **-97.190451000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=562074&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-12-09**
DRILLING DATE (COMPLETED): **2020-12-09**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 27 **Distance from Property: 0.49 mi. ESE**

TRACK #: **542815**
DATE ENTERED: **2020-05-07**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351454000** LONGITUDE: **-97.190340000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=542815&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-04-15**
DRILLING DATE (COMPLETED): **2020-04-15**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 28 **Distance from Property: 0.47 mi. ESE**

TRACK #: **556079**
DATE ENTERED: **2020-10-12**
OWNER NAME: **JHHB LLC**
OWNER ADDRESS: **PO BOX 270285**
FLOWER MOUND, TX 75027
COUNTY: **JOHNSON**
LATITUDE: **32.351963000** LONGITUDE: **-97.190340000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=556079&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-10-01**
DRILLING DATE (COMPLETED): **2020-10-01**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 28 **Distance from Property: 0.50 mi. ESE**

TRACK #: **562052**
DATE ENTERED: **2020-12-21**
OWNER NAME: **ANTLER HOMEBUILDERS LLC**
OWNER ADDRESS: **PO BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.352068000** LONGITUDE: **-97.189887000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=562052&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-12-08**
DRILLING DATE (COMPLETED): **2020-12-08**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 29 **Distance from Property: 0.51 mi. E**

TRACK #: **562077**
DATE ENTERED: **2020-12-21**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **PO BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.353056000** LONGITUDE: **-97.189382000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=562077&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-12-09**
DRILLING DATE (COMPLETED): **2020-12-09**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 29 **Distance from Property: 0.49 mi. E**

TRACK #: **562081**
DATE ENTERED: **2020-12-21**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **PO BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.353086000** LONGITUDE: **-97.189713000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=562081&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-12-09**
DRILLING DATE (COMPLETED): **2020-12-09**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 30 **Distance from Property: 0.52 mi. ESE**

TRACK #: **557790**
DATE ENTERED: **2020-10-29**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **PO BOX 270285**
FLOWER MOUND, TX 75027
COUNTY: **JOHNSON**
LATITUDE: **32.352059000** LONGITUDE: **-97.189408000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=557790&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-10-15**
DRILLING DATE (COMPLETED): **2020-10-15**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 31 **Distance from Property: 0.52 mi. ESE**

TRACK #: **542817**
DATE ENTERED: **2020-05-07**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351457000** LONGITUDE: **-97.189802000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=542817&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-04-16**
DRILLING DATE (COMPLETED): **2020-04-16**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 31 **Distance from Property: 0.54 mi. ESE**

TRACK #: **542818**
DATE ENTERED: **2020-05-07**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351492000** LONGITUDE: **-97.189323000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=542818&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-04-16**
DRILLING DATE (COMPLETED): **2020-04-16**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 32 **Distance from Property: 0.55 mi. E**

TRACK #: **556064**
DATE ENTERED: **2020-10-12**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 76028
COUNTY: **JOHNSON**
LATITUDE: **32.353027000** LONGITUDE: **-97.188657000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=556064&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-10-01**
DRILLING DATE (COMPLETED): **2020-10-01**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 33 **Distance from Property: 0.57 mi. ESE**

TRACK #: **553625**
DATE ENTERED: **2020-09-10**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351957000** LONGITUDE: **-97.188719000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=553625&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-09-01**
DRILLING DATE (COMPLETED): **2020-09-01**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 34 **Distance from Property: 0.59 mi. E**

TRACK #: **556093**
DATE ENTERED: **2020-10-12**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT**
FLOWER MOUND, TX 76028
COUNTY: **JOHNSON**
LATITUDE: **32.352781000** LONGITUDE: **-97.188060000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=556093&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-09-30**
DRILLING DATE (COMPLETED): **2020-09-30**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 35 **Distance from Property: 0.60 mi. ESE**

TRACK #: **523793**
DATE ENTERED: **2019-10-10**
OWNER NAME: **JOSHUA RAMOS**
OWNER ADDRESS: **8228 HARVEST DR.**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.351409000** LONGITUDE: **-97.188367000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=523793&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2019-10-04**
DRILLING DATE (COMPLETED): **2019-10-04**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **120'**
WATER LEVEL DATE: **2019-10-04**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING COMPANY**
COMPANY ADDRESS: **3311 NORTH COMMERCE STREET**
FORT WORTH, TX 76106

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 36 **Distance from Property: 0.61 mi. W**

ID NUMBER:	**TX236023**
STATE ID :	**32-47-1**
OWNER NAME:	**BILL WEST**
DATE DRILLED:	**02/13/1988**
DEPTH DRILLED:	**225'**
STATIC LEVEL:	**120'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.219928000**
LATITUDE:	**32.349588000**

2 PAGE(S) OF DRILLERS' LOGS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

Water Well ID: 236023

[redacted] [redacted]

Please use black ink. Send original copy by certified mail to the Texas Water Commission P.O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

1) OWNER Bill West (Name) Address 3728 Loughton (Street or RFD) Ft. Worth (City) TX (State) 76110 (Zip)

2) LOCATION OF WELL: County Johnson 3 miles in E-SE (N.E., S.W., etc.) direction from Alvarado (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☒ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other _____

5) DRILLING METHOD (Check): ☐ Driven ☒ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other _____

6) WELL LOG:
Date Drilling: Started 2-1 1988 Completed 2-13 1988

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	225

From (ft.)	To (ft.)	Description and color of formation material
0	5	Top soil
5	20	Grey Shale
20	35	Sand
35	85	Green Shale
85	107	Sand
107	180	Green Shale
180	195	Sand
195	204	White lime
204	225	Grey Shale

RECEIVED
APR 22 1988
TEXAS WATER COMMISSION

(Use reverse side if necessary)

7) BOREHOLE COMPLETION:
☒ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other _____
If Gravel Packed give interval . . . from _____ ft. to _____ ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4½	N	Steel	surface	185	

9) CEMENTING DATA (Rule 319.44(b))
Cemented from 185 ft. to surface No. of Sacks Used 15
_____ ft. to _____ ft. No. of Sacks Used _____
Method used. Pressure
Cemented by Masters Drilling

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed (Rule 319.44(a))
☒ Pitless Adapter Used (Rule 319.44(d))
☐ Approved Alternative Procedure Used (Rule 319.71)

11) WATER LEVEL:
Static level 120 ft. below land surface Date 2-13-88
Artesian flow _____ gpm. Date _____

12) PACKERS: Type: Shale Basket Depth: 195

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc. 168 ft.

14) WELL TESTS:
Type Test: ☐ Pump ☒ Bailer ☐ Jetted ☐ Estimated
Yield: 10 gpm with 0 ft. drawdown after 2 hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Charley Masters Drilling Co. (Type or Print) Water Well Driller's License No. 2322
ADDRESS 3631 Galvez (Street or RFD) FORT WORTH (City) TX (State) 76111 (Zip)
(Signed) Marshall Coleman (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only Well No. 47-1 Located on map _____

WWD-012 (Rev.01-28-87) TEXAS WATER COMMISSION COPY

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

Page # 2 out of 2

Water Well ID: 236023



SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 37 **Distance from Property: 0.61 mi. E**

TRACK #: **556053**
DATE ENTERED: **2020-10-12**
OWNER NAME: **ANTLER HOMEBUILDERS, LLC**
OWNER ADDRESS: **PO BOX 270285**
FLOWER MOUND, TX 75027
COUNTY: **JOHNSON**
LATITUDE: **32.352335000** LONGITUDE: **-97.187772000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=556053&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-09-30**
DRILLING DATE (COMPLETED): **2020-09-30**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 38 **Distance from Property: 0.63 mi. ESE**

TRACK #: **551090**
DATE ENTERED: **2020-08-16**
OWNER NAME: **ANTLER HOME BUILDERS, LLC**
OWNER ADDRESS: **1709 SHADYWOOD CT.**
FLOWER MOUND, TX 75028
COUNTY: **JOHNSON**
LATITUDE: **32.351891000** LONGITUDE: **-97.187651000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=551090&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-08-03**
DRILLING DATE (COMPLETED): **2020-08-03**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 39 **Distance from Property: 0.63 mi. ESE**

TRACK #: **560662**
DATE ENTERED: **2020-12-03**
OWNER NAME: **LARIZ FAMILY HOMES**
OWNER ADDRESS: **340 ALLENWOOD DR**
FORT WORTH, TX 76134
COUNTY: **JOHNSON**
LATITUDE: **32.351324000** LONGITUDE: **-97.187775000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=560662&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2020-11-11**
DRILLING DATE (COMPLETED): **2020-11-11**
DEPTH DRILLED: **30'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **2020-11-11**
TYPE OF WATER: **POTABLE**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **LONE STAR DRILLING COMPANY**
COMPANY ADDRESS: **3311 NORTH COMMERCE STREET**
FORT WORTH, TX 76106

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 40 **Distance from Property: 0.65 mi. WSW**

ID NUMBER:	**TX236024**
STATE ID :	**32-47-1A**
OWNER NAME:	**JOE SIMS**
DATE DRILLED:	**07/26/1978**
DEPTH DRILLED:	**267'**
STATIC LEVEL:	**100'**
WATER USAGE:	**IRRIGATION**
LONGITUDE:	**-97.219835000**
LATITUDE:	**32.347123000**

1 PAGE(S) OF DRILLERS' LOGS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

Water Well ID: 236024

RECEIVED
DEC 6 1978

Dupe

Send original copy by certified mail to the Texas Water Development Board P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

DEPT. OF WATER RESOURCES

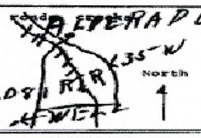
For TWDB use only
Well No.
Located on map
Received:

1) OWNER:
Person having well drilled Joe Sims (Name) Address Rt. 4 Box 120 (Street or RFD) Grandview (City) Texas (State) 76050

Landowner same (Name) Address (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Johnson, 3 miles in S (N.E., S.W., etc.) direction from Alvarado (Town)

Locate by sketch map showing landmarks, roads, hiway number, etc.*



(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor League
Block Survey
Abstract No.
(NW¼ NE¼ SW¼ SE¼) of Section

3) TYPE OF WORK (Check): New Well X, Deepening, Reconditioning, Plugging

4) PROPOSED USE (Check): Domestic, Industrial, Municipal, Irrigation X, Test Well, Other

5) TYPE OF WELL (Check): Rotary X, Driven, Dug, Cable, Jetted, Bored

6) WELL LOG:
Diameter of hole 7 in. Depth drilled 267 ft. Depth of completed well 267 ft. Date drilled 7-28-78
All measurements made from 0 ft. above ground level.

From (Ft.)	To (Ft.)	Description and color of formation material
0	3	soil
3	20	yellow clay
20	45	blue shale
45	60	hard sand
60	80	shale
80	110	real fine sand (hard)
110	130	shale
130	155	sand
155	183	shale
183	220	sandy shale
220	235	hard sand
235	267	white rock

(Use reverse side if necessary)

9) Casing:
Type: Old, New X, Steel, Plastic X, Other
Cemented from ft. to ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
4½" OD	all the way		

10) SCREEN:
Type
Perforated, Slotted X (saw)

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
	opposite best sand		

7) COMPLETION (Check):
Straight wall, Gravel packed X, Other
Under reamed, Open Hole

8) WATER LEVEL:
Static level 100 ft. below land surface Date 7-28-78
Artesian pressure lbs. per square inch Date
Depth to pump bowls, cylinder, jet, etc., ft. below land surface.
1½ H.P. Red Jacket pump 1100
140' 1¼" plastic pipe

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom?
Yield: gpm with ft. drawdown after hrs.
Bailer test gpm with ft. drawdown after hrs.
Artesian flow gpm
Temperature of water

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? depth of strata

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

NAME C. M. Stoner (Type or Print) Water Well Drillers Registration No. 12

ADDRESS Rt. 5 Cleburne Texas 76031 (Street or RFD) (City) (State)

(Signed) C. M. Stoner (Water Well Driller) Stoner Drilling Inc. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDBE-WD-8

X

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SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 41 **Distance from Property: 0.66 mi. ESE**

TRACK #: **576413**
DATE ENTERED: **2021-06-18**
OWNER NAME: **ANTLER HOMEBUILDERS LLC**
OWNER ADDRESS: **P. O. BOX 1840**
WEATHERFORD, TX 76086
COUNTY: **JOHNSON**
LATITUDE: **32.351030000** LONGITUDE: **-97.187270000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=576413&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2021-06-16**
DRILLING DATE (COMPLETED): **2021-06-16**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ERWIN WATER WELL DRILLING**
COMPANY ADDRESS: **6991 FM 4**
JACKSBORO, TX 76458

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 42 **Distance from Property: 0.68 mi. NNW**

TRACK #: **314418**
DATE ENTERED: **2013-03-25**
OWNER NAME: **HALLIBURTON JET RESEARCH CENTER**
OWNER ADDRESS: **8432 S I-35, W**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.368267000** LONGITUDE: **-97.208029000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=314418&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2012-10-10**
DRILLING DATE (COMPLETED): **2012-12-25**
DEPTH DRILLED: **1560'**

WATER LEVEL:
STATIC LEVEL: **1100'**
WATER LEVEL DATE: **2012-12-15**
TYPE OF WATER: **DRINKING**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
PUBLIC SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **CENTRAL TEXAS WATER WELL**
COMPANY ADDRESS: **P.O. BOX 1184**
BOWIE, TX 76230

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 43 **Distance from Property: 0.71 mi. NE**

TRACK #: **16107**
DATE ENTERED: **2003-01-21**
OWNER NAME: **J. WIGGLESWORTH**
OWNER ADDRESS: **3125 CR 204**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.368229000** LONGITUDE: **-97.192615000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=16107&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2003-01-02**
DRILLING DATE (COMPLETED): **2003-01-03**
DEPTH DRILLED: **240'**

WATER LEVEL:
STATIC LEVEL: **130'**
WATER LEVEL DATE: **2003-01-03**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 44 **Distance from Property: 0.71 mi. ESE**

TRACK #: **484678**
DATE ENTERED: **2018-07-19**
OWNER NAME: **DAN FINN**
OWNER ADDRESS: **8308 HARVEST DR.**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.351152000** LONGITUDE: **-97.186497000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=484678&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2018-07-12**
DRILLING DATE (COMPLETED): **2018-07-12**
DEPTH DRILLED: **310'**

WATER LEVEL:
STATIC LEVEL: **NOT REPORTED**
WATER LEVEL DATE: **NOT REPORTED**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **PRICELESS WATER WELLS**
COMPANY ADDRESS: **12800 TIMBERLAND DR.**
FORT WORTH, TX 76244

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 45 **Distance from Property: 0.73 mi. SE**

TRACK #: **99726**
DATE ENTERED: **2006-12-11**
OWNER NAME: **MURPHY SCOTT RESOURCES, L.P.**
OWNER ADDRESS: **P O BOX 1488**
JOSHUA, TX 76058
COUNTY: **JOHNSON**
LATITUDE: **32.342950000** LONGITUDE: **-97.192298000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=99726&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2006-12-05**
DRILLING DATE (COMPLETED): **2006-12-06**
DEPTH DRILLED: **265'**

WATER LEVEL:
STATIC LEVEL: **200'**
WATER LEVEL DATE: **2006-12-06**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

WATER UTILITY DATABASE (WUD)

MAP ID# 46 **Distance from Property: 0.73 mi. NNW**

PWSID:	**1260137**
SOURCE ID:	**G1260137A**
UTILITY NAME:	**HALLIBURTON JET RESEARCH CENTER**
DATE DRILLED:	**12/25/2012**
SCREEN BOTTOM:	**0.00'**
SCREEN TOP:	**0.00'**
GALLONS PER MINUTE:	**45**
WELL STATUS:	**INACTIVE**
WATER USAGE:	**INACTIVE - NON-POTABLE**
CCN:	**NOT APPLICABLE**
LONGITUDE:	**-97.204444000**
LATITUDE:	**32.370556000**
OWNER'S NAME:	**HALLIBURTON JET RESEARCH CENTER**
ADDRESS:	**3000 N SAM HOUSTON PKWY E**
CITY:	**HOUSTON** STATE: **TX** ZIP CODE: **77032-3219**

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 47 **Distance from Property: 0.79 mi. WSW**

TRACK #: **526236**
DATE ENTERED: **2019-10-14**
OWNER NAME: **LARRY WORD REVOCABLE TRUST**
OWNER ADDRESS: **7140 CR 313**
ALVARADO, TX 76009
COUNTY: **JOHNSON**
LATITUDE: **32.344282000** LONGITUDE: **-97.220702000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=526236&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2019-09-02**
DRILLING DATE (COMPLETED): **2019-09-16**
DEPTH DRILLED: **69'**

WATER LEVEL:
STATIC LEVEL: **600'**
WATER LEVEL DATE: **2019-09-16**
TYPE OF WATER: **NOT REPORTED**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
DOMESTIC
COMPANY INFORMATION:
COMPANY NAME: **ACTION WATER WELLS**
COMPANY ADDRESS: **PO BOX 7**
RHOME, TX 76078

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 48 **Distance from Property: 0.80 mi. E**

TRACK #: **67239**
DATE ENTERED: **2005-09-19**
OWNER NAME: **STROUD ENERGY**
OWNER ADDRESS: **210 W. 6 TH ST.; SUITE 500**
FT. WORTH, TX 76102
COUNTY: **JOHNSON**
LATITUDE: **32.351667000** LONGITUDE: **-97.184722000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=67239&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2005-09-15**
DRILLING DATE (COMPLETED): **2005-09-15**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **50'**
WATER LEVEL DATE: **2005-09-15**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
RIG SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

TEXAS WATER DEVELOPMENT BOARD GROUNDWATER DATABASE (TWDB)

MAP ID# 49 **Distance from Property: 0.85 mi. ESE**

STATE ID:	**32-47-203**
OWNER'S NAME:	**L. W. BURKS**
DATE DRILLED:	**06/26/1964**
DEPTH DRILLED:	**245'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.185278000**
LATITUDE:	**32.348334000**
SOURCE:	**TWDB**
DOCUMENT LINK:	**http://s3.amazonaws.com/welipdfs/documents/3247203/3247203.pdf**

WRD Exp. (GW)
April 1966

PX 32-47-203
4 SE Alvarado

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by: Geo. Shifer — Source of data: D. log obs. — Date: 8-10-66 — Map: Grandview Quad. 1:24000

State: Texas 49 — County (or town): Johnson PX

Latitude: 32 20 53 N — Longitude: 097 11 06 — Sequential number: 1

Lat-long accuracy: T N S R E W Sec

Local well number: 32-47-203 — Other number: B & M

Local use: — Owner or name: L.W. Burks

Owner or name: L. W. BURKS — Address: Box 484 Alvarado Tex.

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — P

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Mod, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — D

Use of well: (A) Anode, (D) Drain, (E) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — W

DATA AVAILABLE: Well data — Freq. W/L meas.: — Field aquifer char.

Hyd. lab. data:

Qual. water data: type:

Freq. sampling: — Pumpage inventory: yes no; period:

Aperture cards: yes

Log data: Drillers log — U.S.G.S. file — D

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD — Depth well: 245 ft 245 — Meas. (top): D. log — accuracy

Depth cased: (first perf.) 187 ft 187 — Casing type: — Diam. 4 1/2 in 4

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — P

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: 1964 964 — Pump intake setting: 185 ft 185

Driller: Stoner Drlg. Co. (name), Keene, Texas (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — S — Deep Shallow — D

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 3/4 — T — Trans. or meter no.

Descrip. MP — ft above below LSD. Alt. MP

Alt. LSD: 704 — Accuracy: (source) Topo map

Water Level: 170 ft above below MP; Ft above below LSD 170 — Accuracy: D. log

Date meas: 10-26-64 — Yield: 8 R gpm — Method determined

Drawdown: ft — Accuracy: — Pumping period hrs

QUALITY OF WATER DATA: Iron ppm — Sulfate ppm — Chloride ppm — Hard. ppm

Sp. Conduct K x 10^6 — Temp. °F — Date sampled

Taste, color, etc.

New house, can't find well — must be concealed in Light Post — no one home.

Well No. PX 32-46-203

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

Well No. PX 32-47-203

Latitude-longitude N S ° ' " ° ' "

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: | Section:

Drainage Basin: | Subbasin:

Type of well site: (D) depression, (G) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Q) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat

MAJOR AQUIFER: Cretaceous (system) Gulf (series) X Woodbine (aquifer, formation, group)

Lithology: Snd | 5 | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

MINOR AQUIFER: (system) (series) (aquifer, formation, group)

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

Intervals Screened: 187-193; 204-207; 213-219 ft. perf

Depth to consolidated rock: ft | Source of data:

Depth to basement: ft | Source of data:

Surficial material: | Infiltration characteristics:

Coefficient Trans: gpd/ft | Coefficient Storage:

Coefficient Perm: gpd/ft²; Spec Cap: gpm/ft; Number of geologic cards:

Csg. cem 0-345 ft.

BOLT No.

GPO 857-700

File original copy with Texas Water Commission, P. O. Box 2311, Capitol Station, Austin 11, Texas

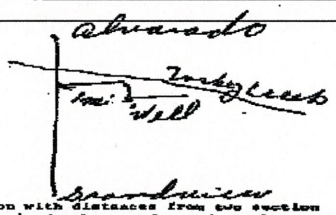
State of Texas

DRILLERS LOG AND WELL DATA REPORT

For use by TWC only
Well No.
Located on map
By Date
Map no.

1) Well Owner: L. W. Burks — Box 484 — Alvarado — Texas
2) Land Owner: Same
3) Intended use: Industrial ☐ Municipal ☐ Irrigation ☐ Other Farm
4) Location of well: County Johnson — Labor — League — Abstract No.
NW¼ NE¼ SW¼ SE¼ of Section — Block No. — Survey

3 miles in S direction
from Alvarado E. of Alvarado



Map 1

PK32-47-203

Sketch map of well location with distances from two section or survey lines, and to landmarks, roads, and creeks.

DRILLERS LOG OF WELL

Method of drilling: rotary — Diameter of hole 6 in. — Date drilled 6 - 26 - 1964

All measurements made from 0 ft. above ground level.

From (ft)	To (ft)	Description and color of formation material
0	3	soil
3	24	yellow clay
24	45	sand
45	80	blue shale
80	108	brown shale
108	135	brown sandy shale
135	144	sand
144	157	sandy shale
157	162	sand
162	168	broken sand
168	179	sand
179	187	sandy
187	193	sand
193	204	shale
204	207	sand
207	210	shale
210	219	sand
219	245	shale
245		

(Use continuation sheets if necessary)

COMPLETION DATA

COMPLETION
Straight wall ☒
Under reamed ☐
Gravel packed ☐
Open hole ☐
Other

CASING
Type: Old ☐ New ☒
Cemented from 245 ft.
to top ft.
30 sks of cement

Diameter (inches)	Setting from (ft)	Setting to (ft)
4½" O. D. all the way		

SCREEN
Type
Perforated ☐ Slotted ☐

Diameter (inches)	Setting from (ft)	Setting to (ft)
4½" O. D.		
6 shots	187	193
6 shots	213	219
4 shots	204	207
4 shots	187	192

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

C. M. Stoner (Driller) — Stoner Drilling Co (Company Name) — Reg. No. 162

Please attach electric log, chemical analysis, and other pertinent information if available.

If well was tested by your company or if you installed the permanent pump please complete the following:

WATER LEVEL AND PUMP DATA

Static water level 170 ft. below

Pumping level

feet	hours	gpm

Pump type submersible
Designed pumping rate 8 gpm ☐ gph ☐
Type power unit electric
Horsepower 3/4
Depth to bowls, cylinder, jet, etc., 185 ft. below pump base.

If contractor testing well or installing permanent pump if other than your company:

(T-4)

PK32-47-203

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 50 **Distance from Property: 0.85 mi. E**

TRACK #: **67240**
DATE ENTERED: **2005-09-19**
OWNER NAME: **STROUD ENERGY**
OWNER ADDRESS: **210 W. 6 TH ST., SUITE 500**
FT. WORTH, TX 76102
COUNTY: **JOHNSON**
LATITUDE: **32.352501000** LONGITUDE: **-97.183611000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=67240&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2005-09-16**
DRILLING DATE (COMPLETED): **2005-09-16**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **50'**
WATER LEVEL DATE: **2005-08-16**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
RIG SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 51 **Distance from Property: 0.86 mi. W**

TRACK #: **124357**
DATE ENTERED: **2007-10-11**
OWNER NAME: **DEVON**
OWNER ADDRESS: **PO BOX 1340**
BRIDGEPORT, TX 76426
COUNTY: **JOHNSON**
LATITUDE: **32.349445000** LONGITUDE: **-97.224167000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=124357&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2007-09-05**
DRILLING DATE (COMPLETED): **2007-09-13**
DEPTH DRILLED: **20'**

WATER LEVEL:
STATIC LEVEL: **1209'**
WATER LEVEL DATE: **2007-09-18**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
RIG SUPPLY
COMPANY INFORMATION:
COMPANY NAME: **BIFFLE WATER WELL**
COMPANY ADDRESS: **PO BOX 1299**
GAINESVILL, TX 76240

SUBMITTED DRILLERS REPORT DATABASE (SDRD)

MAP ID# 52 **Distance from Property: 0.93 mi. E**

TRACK #: **30121**
DATE ENTERED: **2003-12-29**
OWNER NAME: **JIMMY & CLAUDIA ATLAS**
OWNER ADDRESS: **4920 CR 401**
GRANDVIEW, TX 76050
COUNTY: **JOHNSON**
LATITUDE: **32.353533000** LONGITUDE: **-97.182104000**
REPORT LINK: **https://www3.twdb.texas.gov/apps/waterdatainteractive/GetReports.aspx?Num=30121&Type=SDR-Well**

WELL LOG:
DRILLING DATE (STARTED): **2003-11-20**
DRILLING DATE (COMPLETED): **2003-11-20**
DEPTH DRILLED: **220'**

WATER LEVEL:
STATIC LEVEL: **140'**
WATER LEVEL DATE: **2003-11-20**
TYPE OF WATER: **FRESH**

TYPE OF WORK:
NEW WELL
PROPOSED USE:
STOCK
COMPANY INFORMATION:
COMPANY NAME: **GEYER DRILLING CO. INC.**
COMPANY ADDRESS: **108 W. BROAD ST**
MANSFIELD, TX 76063

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 53 **Distance from Property: 0.94 mi. NE**

ID NUMBER:	**TX236029**
STATE ID :	**32-47-2**
OWNER NAME:	**G A STAPLETON**
DATE DRILLED:	**03/13/1987**
DEPTH DRILLED:	**170'**
STATIC LEVEL:	**80'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.187416000**
LATITUDE:	**32.368865000**

2 PAGE(S) OF DRILLERS' LOGS

Please use black ink.
Send original copy by certified mail to the Texas Water Commission P.O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER B. A. Stapleton (Name) Address R.T. 4 (Street or RFD) Grandview (City) Texas (State) 76050 (Zip)

2) LOCATION OF WELL: County Johnson 4 miles in N. (N.E., S.W., etc.) direction from Grandview (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this report.

Well NO 2 in Grandview Johnson

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____

☑ See attached map. on 32-46-6

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Monitor ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Injection ☐ Other

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Jetted ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Other ☐ Driven

6) WELL LOG:
Date Drilling: Started 3/11 1987 Completed 3/13 1987

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	170
	170	0

From (ft.)	To (ft.)	Description and color of formation material
0	25	Red sand Rock
25	80	Shale & Clay
80	150	Sandy Shale & Rock
150	170	Water Sand

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Undereamed
☑ Gravel Packed ☐ Other
If Gravel Packed give interval . . . from 150 ft. to 0 ft.

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc.; Perf., Slotted, etc. Screen Mfr., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
6	N.	Steel	170	0	125
4½		Slotted	170	150	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 150 ft. to 0 ft. No. of Sacks Used 3
ft. to ft. No. of Sacks Used
Method used Poured
Cemented by Gerald Warren

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☑ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 50 ft. below land surface Date 3/13/87
Artesian flow gpm. Date

12) PACKERS: Type Depth
None

13) TYPE PUMP:
☐ Turbine ☐ Jet ☑ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., 126 ft.

14) WELL TESTS:
Type Test: ☑ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 15 gpm with 0 ft. drawdown after 24 hrs.

RECEIVED
JUN 10 1987
TEXAS WATER COMMISSION

(Use reverse side if necessary)

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? ☐ Yes ☑ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Warren's Well Service (Type or Print) Water Well Driller's License No. 1557

ADDRESS P.O. Box 106 (Street or RFD) Cranfills Gap (City) Texas (State) 76637 (Zip)

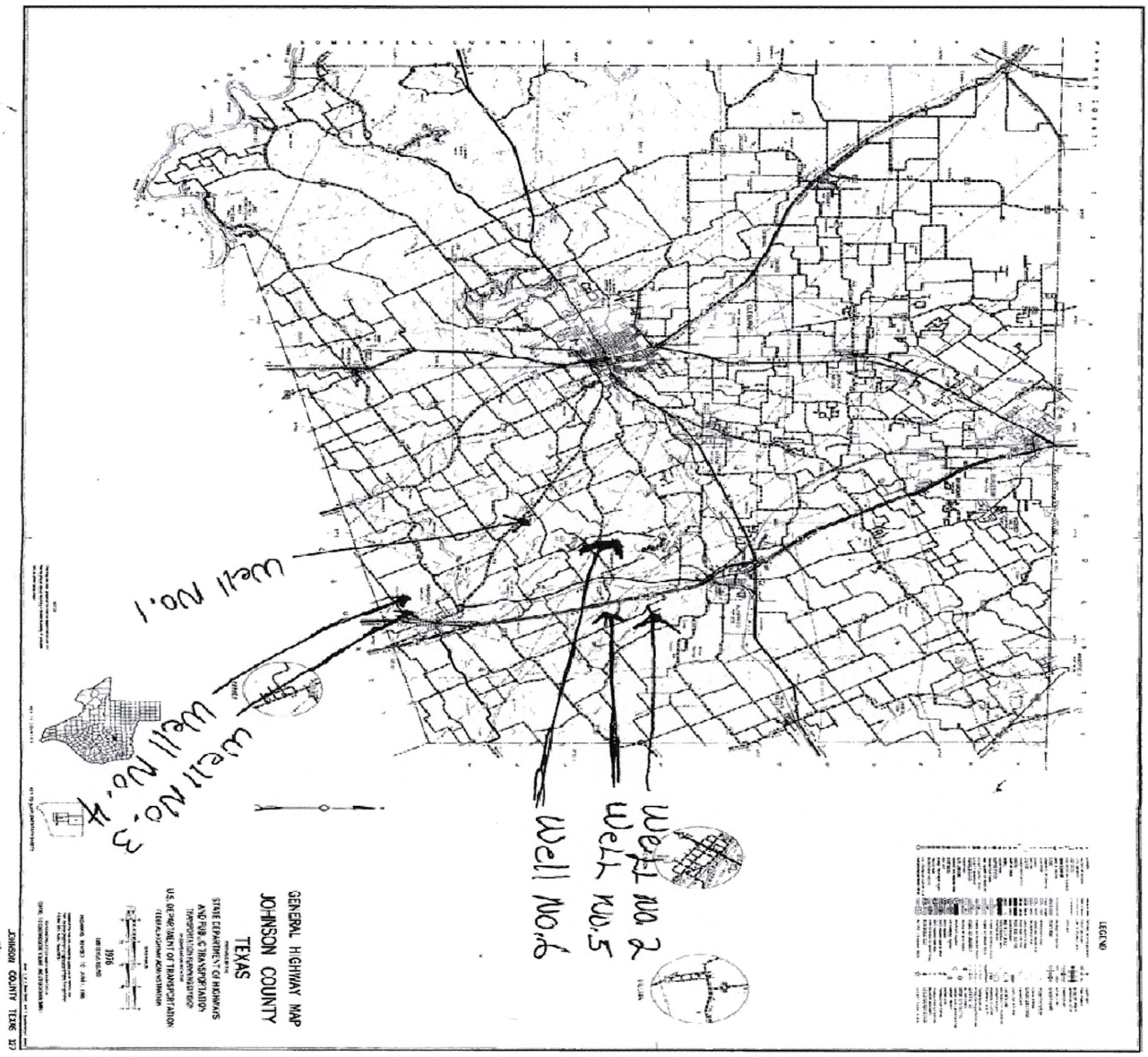
(Signed) Gerald Warren (Licensed Water Well Driller) (Signed) Ernesto Alvarez (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TWC use only Well No. 32-47-2 Located on map

TWC-0382 (Rev. 06-10-85) TEXAS WATER COMMISSION COPY

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

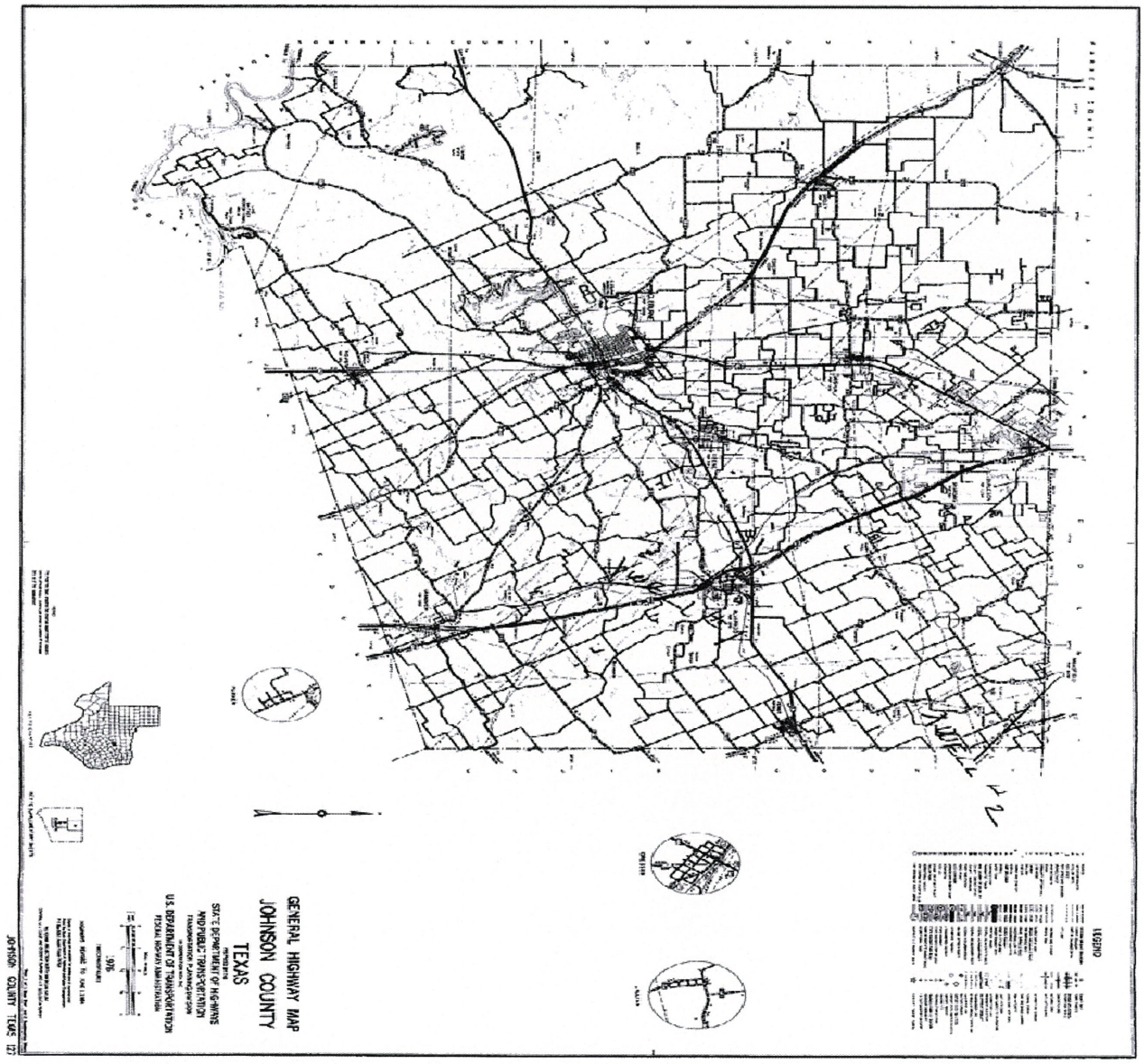

GENERAL HIGHWAY MAP
JOHNSON COUNTY
TEXAS
STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION
1976
JOHNSON COUNTY TEXAS
well No.1
well No.3
well No.4
well No.2
well No.5
well No.6

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 54 **Distance from Property: 0.94 mi. WNW**

ID NUMBER:	**TX236025**
STATE ID :	**32-47-1C**
OWNER NAME:	**JACK HIXON**
DATE DRILLED:	**07/09/1984**
DEPTH DRILLED:	**160'**
STATIC LEVEL:	**60'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.225006000**
LATITUDE:	**32.354910000**

2 PAGE(S) OF DRILLERS' LOGS


GENERAL HIGHWAY MAP
JOHNSON COUNTY
TEXAS
STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
JOHNSON COUNTY, TEXAS

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

1) OWNER Jack Hixon (Name) Address P.O. Box 71 (Street or RFD) Alvarado (City) Texas (State) 76007 (Zip)

2) LOCATION OF WELL: County Johnson 4 miles in S. (N.E., S.W., etc.) direction from Alvarado (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

Well No. 2. in Johnson

☐ Legal description: Section No. ____ Block No. ____ Township ____ Abstract No. ____ Survey Name ____ Distance and direction from two intersecting section or survey lines ____

☑ See attached map.

3) TYPE OF WORK (Check): ☑ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☑ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ____

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ____

6) WELL LOG: Date drilled 7/8/84

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	
	160	0

7) BOREHOLE COMPLETION: ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☑ Gravel Packed ☐ Other ____ If Gravel Packed give interval . . . from ____ ft. to ____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	5	Red Dirt
5	15	Yellow Clay
15	120	Blue Shale
120	160	Water Sand

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4½	N	Steel	160	0	125
		Slotted	160	140	

CEMENTING DATA
Cemented from 140 ft. to 0 ft.
Method used Porred
Cemented by Gerald Warren (Company or Individual)

9) WATER LEVEL: Static level 60 ft. below land surface Date 7/8/84 Artesian flow ____ gpm. Date ____

10) PACKERS: Type Depth
Rubber 140

11) TYPE PUMP: ☐ Turbine ☐ Jet ☑ Submersible ☐ Cylinder ☐ Other ____ Depth to pump bowls, cylinder, jet, etc., 105 ft.

12) WELL TESTS: ☐ Type Test: ☑ Pump ☐ Bailer ☐ Jetted ☐ Estimated Yield: 20 gpm with 0 ft. drawdown after 24 hrs.

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OCT 17 1984
DEPT. OF WATER RESOURCES

(Use reverse side if necessary)

13) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? ____ Depth of strata ____ Was a chemical analysis made? ☐ Yes ☑ No

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

COMPANY NAME Warren's Well Service (Type or Print) Water Well Driller's License No. 1557

ADDRESS Box 106 (Street or RFD) Cran Fills (City) Gay (State) Texas (Zip) 76637

(Signed) Gerald Warren (Licensed Water Well Driller) (Signed) Ernest Olson (Registered Driller Trainee)

For TDWR use only Well No. 32-47-1C Located on map Yes DIF

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 5-27-82) DEPARTMENT OF WATER RESOURCES COPY

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

MAP ID# 55 **Distance from Property: 0.97 mi. SE**

ID NUMBER:	**TX236028**
STATE ID :	**32-47-2**
OWNER NAME:	**JAMES WIGGLESWORTH**
DATE DRILLED:	**04/18/1996**
DEPTH DRILLED:	**262'**
STATIC LEVEL:	**135'**
WATER USAGE:	**DOMESTIC**
LONGITUDE:	**-97.191124000**
LATITUDE:	**32.339099000**

1 PAGE(S) OF DRILLERS' LOGS

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY WATER WELLS (TCEQ)

Water Well ID: 236028

Send original copy by certified mail to: TNRCC, P.O. Box [redacted]087, Austin, TX 78711-3087 — *Please use black ink.*

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

State of Texas
WELL REPORT

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

1) **OWNER** JAMES WIGGLESWORTH (Name) **ADDRESS** RT 4 BOX 112A (Street or RFD) GRANDVIEW (City) TX. (State) (Zip)

2) **ADDRESS OF WELL:** County JOHNSON HWY 35 S (Street, RFD or other) ALVARADO (City) TX. (State) (Zip) **GRID #** 32-47-2

3) **TYPE OF WORK (Check):** [X] New Well [ ] Deepening [ ] Reconditioning [ ] Plugging

4) **PROPOSED USE (Check):** [ ] Monitor [ ] Environmental Soil Boring [X] Domestic [ ] Industrial [ ] Irrigation [ ] Injection [ ] Public Supply [ ] De-watering [ ] Testwell
If Public Supply well, were plans submitted to the TNRCC? [ ] Yes [ ] No

5)

6) **WELL LOG:**
Date Drilling: Started 4-17 19 96 Completed 4-18 19 96

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
7	Surface	262

7) **DRILLING METHOD (Check):** [ ] Driven [X] Air Rotary [ ] Mud Rotary [ ] Bored [ ] Air Hammer [ ] Cable Tool [ ] Jetted [ ] Other

From (ft.)	To (ft.)	Description and color of formation material
0	4	TOP SOIL
4	59	SAND, GRAVEL & ROCK
59	80	SANDY SHALE
80	105	SAND
105	115	SHALE BREAK
115	135	SAND
135	145	SH BREAK
145	195	SANDY SHALE
195	245	SAND
245	262	SHALE

(Use reverse side if necessary)

8) **Borehole Completion (Check):** [ ] Open Hole [ ] Straight Wall [ ] Underreamed [X] Gravel Packed [ ] Other
If Gravel Packed give interval ... from 250 ft. to 200 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen
4½	N	PLASTIC	0	250	sch 40
		SLOTTED	250	220	

9) **CEMENTING DATA** [Rule 338.44(1)]
Cemented from 0 ft. to 20 ft. No. of sacks used 3
BENTONITE HOLEPLUG, 200 ft. to 175 ft. No. of sacks used
Method used TOP LOADED & MEASURED IN PLACE
Cemented by GEYER DRILL. CO. INC
Distance to septic system field lines or other concentrated contamination 175 ft.
Method of verification of above distance HOME OWNER

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JUL 18 1996
NATURAL RESOURCE CONSERVATION COMMISSION

10) **SURFACE COMPLETION**
[ ] Specified Surface Slab Installed [Rule 338.44(2)(A)]
[X] Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
[ ] Pitless Adapter Used [Rule 338.44(3)(b)]
[ ] Approved Alternative Procedure Used [Rule 338.71]

13) **TYPE PUMP:**
[ ] Turbine [ ] Jet [X] Submersible [ ] Cylinder
[ ] Other
Depth to pump bowls, cylinder, jet, etc., 220 ft.

14) **WELL TESTS:**
Type test: [ ] Pump [X] Bailer [ ] Jetted [ ] Estimated
Yield: 20+ gpm with 15 ft. drawdown after 1 hrs.

11) **WATER LEVEL:**
Static level 135 ft. below land surface Date 4-17-96
Artesian flow gpm. Date

15) **WATER QUALITY:**
Did you knowingly penetrate any strata which contained undesirable constituents?
[ ] Yes [X] No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Depth of strata
Was a chemical analysis made? [ ] Yes [X] No

12) **PACKERS:** Type Depth
NONE

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME GEYER DRILLING. CO. INC. (Type or print) WELL DRILLER'S LICENSE NO. 1505 WI

ADDRESS 108 W. BROAD ST (Street or RFD) MANSFIELD (City) TX. (State) 76063 (Zip)

(Signed) (Licensed Well Driller) (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TNRCC-0199 (Rev. 11-01-94) TNRCC COPY

GeoSearch www.geo-search.com · phone: 888-396-0042 · fax: 512-472-9967

NWIS United States Geological Survey National Water Information System

VERSION DATE: 1/2020

The U.S. Geological Survey (USGS) National Water Information System (NWIS) includes water inventory data originating from all 50 states, plus border and territorial sites, including data from as early as 1899. This database includes selected site types limited to Groundwater Sites and Spring Sites from the 1.5 million plus sites within NWIS. Surface-Water, Atmospheric, and Other Site types are excluded. Disclaimer: Water Data for the Nation is the USGS public web interface to much of the data stored and managed within NWIS. It is not, however, configured to present all NWIS data and users may need to contact local Water Science Centers to obtain some information. NWIS data is updated on a regularly scheduled basis, and current condition data is generally updated upon receipt at local Water Science Centers.

ENVIRONMENTAL RECORDS DEFINITIONS - STATE (TX)

SSDRD Select Submitted Drillers Report Database Wells

VERSION DATE: 8/2021

This Texas Water Development Board database was created from the online Texas Well Report Submission and Retrieval System (a cooperative TDLR, TWDB system) that registered water-well drillers use to submit their required reports. The system was started in February 2001 and is optional for the drillers to use. This data excludes the following well types: Monitor Wells, Environmental Soil Borings, Injections Wells, De-watering and Test Wells.

TCEQ Texas Commission on Environmental Quality Water Wells

VERSION DATE: NR

The Texas Commission on Environmental Quality (TCEQ) maintains a filing system of plotted and unnumbered water wells. Plotted water wells are filed according to the County indicated by the driller and the state well number assigned by State of Texas personnel. Given the available location information provided by the driller, personnel identify where the approximate well location should be. After well placement a state well number is assigned indicating that the well lies within a specific 2.5' section of a 7.5' quadrangle. This method allows for quicker, more refined, reference when researching a specific area. Unnumbered water wells have not been assigned a state well number. This can occur for a variety of reasons; however it does not mean the well cannot be accurately spotted. Unnumbered water well records are filed according to County and are often broken up by year or by a span of years.

TWDB Texas Water Development Board Groundwater Database

VERSION DATE: 5/2021

The Texas Water Development Board Groundwater Database contains information for more than 123,500 sites in Texas including data on water wells, springs, oil/gas tests, water levels, and water quality. The purpose of the Board's data collection effort over the years has been to gain representative information about aquifers in the state in order to do water planning. It is very important, however, to realize that the wells in the database represent only a small percentage of the wells that actually exist in Texas. A registered water well driller is required by law to send in a report to the State for every well that is drilled. This requirement began in 1965, and we estimate that approximately 500,000 wells have been drilled in Texas since then. Of the 1,000,000 plus water wells drilled in Texas over the past 100 years, more than 130,000 have been inventoried and placed into the TWDB groundwater database. State well numbers have been assigned to these based on their location within numbered 7 1/2 minute quadrangles formed by lines of latitude and longitude. This database contains well information including location, depth, well type, owner, driller, construction and completion data.

WUD Water Utility Database

VERSION DATE: NR

The Water Utility Database is defined as a collection of data from Texas Water Districts, Public

Drinking Water Systems and Water and Sewer Utilities who submit information to the TCEQ. This database is an integrated database designed and developed to replace over 160 stand alone legacy systems representing over 5 million records of the former Texas Water Commission and the Texas Department of Health.

SUPPLEMENTARY STATE OF TEXAS WATER WELL INFORMATION

STATE OF TEXAS WELL REPORT for Tracking #414545

Owner:	**Jim Grimlan**	Owner Well #:	**1**
Address:	**7500 Greenfield Dr. Alvarado, TX 76009**	Grid #:	**32-47-1**
Well Location:	**7500 Greenfield Dr. Alvarado, TX 76009**	Latitude:	**32° 21' 02.9" N**
		Longitude:	**097° 12' 43.72" W**
Well County:	**Johnson**	Elevation:	**756 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **2/3/2016** Drilling End Date: **2/3/2016**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8	**0**	**180**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
25	**120**	**Gravel**	**16 mesh**
135	**180**	**Gravel**	**16 mesh**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**20**	**Cement 3 Bags/Sacks**
20	**25**	**Bentonite 1 Bags/Sacks**
115	**135**	**Bentonite 5 Bags/Sacks**

Seal Method: **Hand Mixed**

Sealed By: **Driller**

Distance to Property Line (ft.): **65**

Distance to Septic Field or other concentrated contamination (ft.): **200+**

Distance to Septic Tank (ft.): **200+**

Method of Verification: **measurement verified by owner**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **130 ft.** below land surface on **2016-02-03** Measurement Method: **Bailing Line**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **160**

Well Tests: **Bailer** **Yield: 12 GPM with 10 ft. drawdown after 1 hours**

Water Quality:

Strata Depth (ft.)	Water Type
145 - 172	Woodbine

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling**

P.O. Box 2181
Mansfield, TX 76063

Driller Name: **Reece Ray** License Number: **59447**

Apprentice Name: **Justin Sherrill**

Comments: **Loose yellow sand from 5 to 22 feet surface pipe was needed to keep sand from caving in.**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Black Topsoil
5	22	Yellow Sand
22	75	Shale
75	110	Sandy Shale
110	120	Shale w/hard sand streaks
120	145	Shale
145	172	Sand
172	176	Sandy Shale
176	180	Shale/Lime

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
4	Blank	New Plastic (PVC)	sch 40	0	140
8	Surface pipe	New Plastic (PVC)	sch.40	0	20
4	Screen	New Plastic (PVC)	sch.40 0.020	140	180

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #62654

Owner:	**Stroud Energy**	Owner Well #:	**# 2**
Address:	**210 W. ^ th Street, Suite 500 Ft. Worth, TX 76102**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 04" N**
Well Location:	**I 35 @ Exit 17 Alvarado, TX 76009**	Longitude:	**097° 11' 48" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **7/7/2005** Drilling End Date: **7/7/2005**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	220

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
50	220	Gravel	16 mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	15	3 cement
15	50	9 bent HP

Seal Method: **Measured & top loaded**

Sealed By: **Driller**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Estimated**

Surface Completion: **Surface Sleeve Installed**

Water Level: **40 ft.** below land surface on **2005-07-07** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Bailer** **Yield: 50+ GPM with 100 ft. drawdown after 1 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
N/A		

Water Quality:

Strata Depth (ft.)	Water Type
48-----210	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **B. S. Harrison** License Number: **4789**

Comments: **Well started off pumping 60 gpm then dropped off tp 40 gpm and holding**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	3	Top soil
3	41	Red sand/clay
41	48	Gray shale
48	82	Sand
82	100	Brown shale
100	132	Sand
132	160	Shale & sand mix 40 %
160	210	Sand
210	220	Shale/lime

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 New Plastic 0----------220 sch 40
Slotted 220------160 .030
Slotted 120------80 .030

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #62653

Owner:	**Stroud Energy**	Owner Well #:	**# 1**
Address:	**210 W. 6 th St., Suite 500 Ft. Worth, TX 76102**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 03" N**
Well Location:	**Exit 17 & I 35 Alvarado, TX 76009**	Longitude:	**097° 11' 49" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **7/6/2005** Drilling End Date: **7/6/2005**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	220

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
50	220	Gravel	16 mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	15	3 cement
15	50	9 bent HP

Seal Method: **Measured & top loaded**

Sealed By: **Driller**

Distance to Property Line (ft.): **100+**

Distance to Septic Field or other concentrated contamination (ft.): **N/A**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Estimated**

Surface Completion: **Surface Sleeve Installed**

Water Level: **40 ft.** below land surface on **2005-07-06** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Bailer** **Yield: 50+ GPM with 100 ft. drawdown after 1 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
N/A		

Water Quality:

Strata Depth (ft.)	Water Type
48-----210	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **B. S. Harrison** License Number: **4789**

Comments: **Well started off pumping 60 gpm then dropped off to aprox 40 gpm and holding**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	3	Top soil
3	41	Red sand/clay
41	48	Gray shale
48	82	Sand
82	100	Brown shale
100	132	Sand
132	160	Shale & sand mix 40%
160	210	Sand
210	220	Shale/lime mix

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	New	Plastic	0------220 sch 40
Slotted			220---160 .030
Slotted			120---80 .030

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #104498

Owner:	**Steel Master Homes**	Owner Well #:	**No Data**
Address:	**8001 Harvest Dr. Grandview, TX 76050**	Grid #:	**32-47-2**
Well Location:	**No Data**	Latitude:	**32° 21' 07" N**
		Longitude:	**097° 11' 42" W**
Well County:	**Ellis**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **11/9/2006** Drilling End Date: **11/9/2006**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
7.875	0	200

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
140	200	Gravel	

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	100	27

Seal Method: **Pressure**

Sealed By: **COMPANY**

Distance to Property Line (ft.): **10**

Distance to Septic Field or other concentrated contamination (ft.): **55**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **MEASURED**

Surface Completion: **Surface Sleeve Installed**

Water Level: **140 ft.** below land surface on **2006-11-09** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **No Data**

Well Tests: **Estimated** **Yield: 20 GPM with 5 ft. drawdown after .25 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **Unknown**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **BENNETT WATER WELL DRILLING, INC**

7300 W. HWY 377
TOLAR, TX 76476

Driller Name: **JEFF BENNETT** License Number: **4805**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	6	CLAY
6	20	LIME
20	30	SHALE
30	140	LIME
140	180	SAND TAN
180	200	SHALE

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	NEW	PLASTIC	0-160
4	NEW	SCREEN	160-200 .020

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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STATE OF TEXAS WELL REPORT for Tracking #454936

Owner:	**JOEL RODRIGUEZ**	Owner Well #:	**No Data**
Address:	**469 CAGLE CROW RD MONSFIELD, TX 76063**	Grid #:	**32-47-1**
Well Location:	**3909 COUNTY ROAD 401 ALVARADO, TX**	Latitude:	**32° 21' 12.3" N**
		Longitude:	**097° 12' 48.8" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **5/8/2017** Drilling End Date: **5/8/2017**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
10	**0**	**30**
7.875	**30**	**280**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
110	**280**	**Gravel**	

Annular Seal Data: **No Data**

Seal Method: **Pressure**

Sealed By: **Driller**

Distance to Property Line (ft.): **50+**

Distance to Septic Field or other concentrated contamination (ft.): **NOT IN**

Distance to Septic Tank (ft.): **NOT IN**

Method of Verification: **OWNER**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **170 ft.** below land surface on **2017-05-08**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **260**

Well Tests: **Estimated** **Yield: 18 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **AFFORDABLE WATER WELL**

P.O. BOX 1322
BRIDGEPORT, TX 76426

Driller Name: **JAMES DAKE** License Number: **56060**

Apprentice Name: **DILLON LINGO**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	30	TOP SOIL SAND
30	110	WHITE ROCK GREY SHALE
110	200	BLUE SHALE
200	230	SAND GREY SHALE
230	265	SAND
265	280	GREY SHALE

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
8	Blank	New Plastic (PVC)		0	30
4	Blank	New Plastic (PVC)		2	280
4	Screen	New Plastic (PVC)	0.020	220	280

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STATE OF TEXAS WELL REPORT for Tracking #378909

Owner:	**David Pickett**	Owner Well #:	**1**
Address:	**7429 Ridgeview Alvarado, TX 76009**	Grid #:	**32-47-1**
Well Location:	**7429 Ridgeview Alvarado, TX 76009**	Latitude:	**32° 21' 22" N**
		Longitude:	**097° 12' 49" W**
Well County:	**Johnson**	Elevation:	**794 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **10/16/2014** Drilling End Date: **10/16/2014**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	200

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
175	200	Gravel	16 Mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	30	3.5 cement
160	175	6 Bentonite

Seal Method: **Top loaded by hand**

Sealed By: **Driller**

Distance to Property Line (ft.): **70**

Distance to Septic Field or other concentrated contamination (ft.): **150**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Estimated**

Surface Completion: **Surface Sleeve Installed**

Water Level: **140 ft.** below land surface on **2014-10-16** Measurement Method: **Unknown**

Packers: **n/a**

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Bailer** **Yield: 15 GPM with 25 ft. drawdown after 1 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
n/a		

Water Quality:

Strata Depth (ft.)	Water Type
175---195	Woodbine

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling**

P.O. Box
Mansfield, TX 76063

Driller Name: **Reece Ray** License Number: **59447**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0----5----Black Topsoil
5---10----Clay
10--35---Yellow Sand
35---70---Shale
70----80---Sand
80----135---Shale
135---150---Sandy Shale
150---168---Sand
168----175----Shale
175----195---Sand
195----200---Shale/Lime

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4"-----New-------PVC Blank--------0-----180----Sch.40
4"-----New------PVC Screen------180----200----.020

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STATE OF TEXAS WELL REPORT for Tracking #191303

Owner:	**J.D. Meadows**	Owner Well #:	**No Data**
Address:	**8113 Quail Trail Grandview, TX 76050**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 11" N**
Well Location:	**8113 Quail Trail Grandview, TX 76050**	Longitude:	**097° 11' 31" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **4/14/2006** Drilling End Date: **4/14/2006**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
12.25	**0**	**35**
7.875	**35**	**200**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
60	**200**	**Gravel**	

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
-1	**60**	**18**

Seal Method: **Pressure**

Sealed By: **Austin Butler**

Distance to Property Line (ft.): **53**

Distance to Septic Field or other concentrated contamination (ft.): **140**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **40 ft.** below land surface on **2006-04-14** Measurement Method: **Unknown**

Packers: **none**

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Estimated** **Yield: 25 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Jimmy D. Miller**

184 CR 3131
Decatur, TX 76234

Driller Name: **Jimmy D. Miller** License Number: **2436**

Apprentice Name: **Austin Butler**

Comments: **$mew**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	15	Topsoil & Yellow Clay
15	33	Sand
33	60	Blue Shale [Shell]
60	100	Sand & Blue Shale
100	160	Sand & Blue Shale
160	200	Blue Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 1/2 New Plastic +2 - 200
Perforated 70 - 200
8 5/8 New Steel +1 - 35

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STATE OF TEXAS WELL REPORT for Tracking #312903

Owner:	**Bob Maze**	Owner Well #:	**# 1**
Address:	**4341 CR 401 Grandview, TX 76050**	Grid #:	**32-47-1**
Well Location:	**4341 CR 401 Grandview, TX 76050**	Latitude:	**32° 20' 44" N**
		Longitude:	**097° 12' 53" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **3/4/2013** Drilling End Date: **3/4/2013**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
8	**0**	**220**

Drilling Method: **Air Hammer**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
175	**220**	**Gravel**	**16 mesh**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
10	**45**	**6 bentonite**
10	**300**	**3 cement**
170	**180**	**6 bentonite**

Seal Method: **Measured & top loaded**

Sealed By: **Driller**

Distance to Property Line (ft.): **30**

Distance to Septic Field or other concentrated contamination (ft.): **145**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **155 ft.** below land surface on **2013-03-04** Measurement Method: **Unknown**

Packers: **n/A**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Pump** **Yield: 10-12 GPM with 60 ft. drawdown after .5 hours**

Plug Information:

Description (number of sacks & material)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
N/A		

Water Quality:	Strata Depth (ft.)	Water Type
	180----200	fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

P O box 2181
Mansfield, TX 76063

Driller Name: **R. B. Geyer** License Number: **1505**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0--------12--------Top soil
12------30--------Yellow clay
30-------90-------Broken sandy shales
90-------122------Sand
122-----132-------Shale
132-----170-------Sand
170-----180-------Shale
180-----200-------Sand
200-----210-------Shale
210-----220------Shale w/ lime

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4----------New-----------Plastic-----------0-------180---sch40
4----------New-----------Screen----------180------220----.020

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STATE OF TEXAS WELL REPORT for Tracking #16107

Owner:	**J. Wigglesworth**	Owner Well #:	**# 2**
Address:	**3125 CR 204 Alvarado, TX 76009**	Grid #:	**32-47-2**
Well Location:	**3125 CR 204 Alvarado, TX 76009**	Latitude:	**32° 22' 05" N**
		Longitude:	**097° 11' 35" W**
Well County:	**Johnson**	Elevation:	**695 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **1/2/2003** Drilling End Date: **1/3/2003**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
7.875	**0**	**240**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
185	**237**	**Gravel**	

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**20**	**3**
20	**185**	**18 bent**

Seal Method: **trim pipe**

Sealed By: **Geyer Drilling Co**

Distance to Property Line (ft.): **No Data**

Distance to Septic Field or other concentrated contamination (ft.): **0**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **not installed**

Surface Completion: **Surface Sleeve Installed**

Water Level: **130 ft.** below land surface on **2003-01-03** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Bailer** **Yield: 18+ GPM with 40 ft. drawdown after 1 hours**

Water Quality:

Strata Depth (ft.)	Water Type
185-237	fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **B S Harrison** License Number: **4789**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	10	Top soil w/yellow clay
10	35	Gravel mix w/brown shale
35	50	Red sandy clay
50	60	Gray shale
60	72	Sand
72	97	Sand/shale mix
97	110	Blue shale
110	130	Sandy shle
130	140	Sand
140	175	Shale
175	185	Gray shale/some sand
185	237	Sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 New Plastic 240-----surf sch 40
Slotted 237-----197

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STATE OF TEXAS WELL REPORT for Tracking #99726

Owner:	**Murphy Scott Resources, L.P.**	Owner Well #:	**# 1**
Address:	**P O Box 1488** **Joshua, TX 76058**	Grid #:	**32-47-2**
		Latitude:	**32° 20' 37" N**
Well Location:	**9841 I 35 W** **Grandview, TX 76050**	Longitude:	**097° 11' 33" W**
Well County:	**Johnson**	Elevation:	**775 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **12/5/2006** Drilling End Date: **12/6/2006**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	265

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
205	265	Gravel	16 mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	10	3 cement
10	205	9 benseal

Seal Method: **Pumped in with Trim pipe**

Sealed By: **Driller**

Distance to Property Line (ft.): **20**

Distance to Septic Field or other concentrated contamination (ft.): **180**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **200 ft.** below land surface on **2006-12-06** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Submersible** Pump Depth (ft.): **240**

Well Tests: **Pump** **Yield: 20 GPM with 20 ft. drawdown after 24 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
N/A		

Water Quality:

Strata Depth (ft.)	Water Type
196----250	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **B. S. Harrison** License Number: **4789**

Apprentice Name: **Justin Sharrill** Apprentice Number: **3389**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	20	Top soil to yellow clay
20	50	Sand
50	82	Shale
82	100	Sand
100	112	Shale break
112	134	Sand
134	150	Shale
150	196	Sandy shale
196	250	Sand
250	265	Sandy shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	New	Plastic	0------225----sch 40
4	New	Screen	225----265-----.020

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STATE OF TEXAS WELL REPORT for Tracking #34165

Owner:	**Terrell Sullivan**	Owner Well #:	**# 1**
Address:	**8117 Quail Trail Grandview, TX 76050**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 02" N**
Well Location:	**8117 Quail Trail Grandview, TX 76050**	Longitude:	**097° 11' 11" W**
Well County:	**Johnson**	Elevation:	**720 ft. above sea level**
Type of Work:	**New Well**	Proposed Use:	**Irrigation**

Drilling Start Date: **3/12/2004** Drilling End Date: **3/12/2004**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
7.875	**0**	**212**

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
165	**212**	**Gravel**	**16 mesh**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**20**	**2 cement**
145	**165**	**11 bent HP**

Seal Method: **Unknown**

Sealed By: **Driller**

Distance to Property Line (ft.): **60**

Distance to Septic Field or other concentrated contamination (ft.): **120**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **90 ft.** below land surface on **2004-03-13** Measurement Method: **Unknown**

Packers: **NONE**

Type of Pump: **Submersible** Pump Depth (ft.): **180**

Well Tests: **Pump** **Yield: 27 GPM with 40 ft. drawdown after 1 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **R. B. Geyer** License Number: **1505**

Apprentice Name: **Johnny Dennis** Apprentice Number: **WWDAPP00000543**

Comments: **Well is producing aprox 27 gpm of good quality water without iron**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	2	Top soil
2	20	Yellow clay
20	40	Sandy shale
40	100	Gray shale
100	170	Broken sands & shales
170	208	Sand
208	212	Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	New	Plastic	212----surf sch 40
Slotted			210----190

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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #484678

Owner:	**Dan Finn**	Owner Well #:	**No Data**
Address:	**8308 Harvest Dr. Alvarado, TX 76009**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 02.88" N**
Well Location:	**8308 Harvest Dr. Alvarado, TX 76009**	Longitude:	**097° 11' 11.04" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **7/12/2018** Drilling End Date: **7/12/2018**

	Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
Borehole:	**8.75**	**0**	**310**

Drilling Method: **Air Rotary**

Borehole Completion: **Gravel Packed**

Annular Seal Data: **No Data**

Seal Method: **Poured**

Sealed By: **Driller**

Distance to Property Line (ft.): **100**

Distance to Septic Field or other concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed** **Surface Completion by Driller**

Water Level: **No Data**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **212**

Well Tests: **Pump** **Yield: 18 GPM after 2 hours, no drawdown specified**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Priceless Water Wells**

12800 Timberland Dr.
Fort Worth, TX 76244

Driller Name: **Reginald Young** License Number: **56078**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	5	Brown Clay
5	15	Sandy Brown Clay
15	40	Sands
40	170	Gray Shale
170	200	Sandy Gray Shale
200	255	Sand with Shale Layers
255	310	Gray Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia (in.)	Type	Material	Sch./Gage	Top (ft.)	Bottom (ft.)
4.5	Blank	New Plastic (PVC)		0	200
4.5	Screen	New Plastic (PVC)		200	240
4.5	Blank	New Plastic (PVC)		240	260
4.5	Screen	New Plastic (PVC)		260	280
4.5	Blank	New Plastic (PVC)		280	300

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #314418

Owner:	**Halliburton Jet Research Center**	Owner Well #:	**No Data**
Address:	**8432 S I-35, W Alvarado, TX 76009**	Grid #:	**32-47-2**
Well Location:	**8432 S I-35,W Alvarado, TX 76009**	Latitude:	**32° 22' 14" N**
		Longitude:	**097° 12' 16" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Public Supply**

Drilling Start Date: **10/10/2012** Drilling End Date: **12/25/2012** **Plans Approved by TCEQ - YES**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
12.25	0	1560

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
1346	1560	Gravel	16-30

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	1430	773 cement

Seal Method: **Pressure**

Sealed By: **Quasar Energy Services Inc.**

Variance Number: **Owner**

Distance to Property Line (ft.): **200**

Distance to Septic Field or other concentrated contamination (ft.): **0**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Owner**

Surface Completion: **Surface Slab Installed**

Water Level: **1100 ft.** below land surface on **2012-12-15** Measurement Method: **Unknown**

Packers: **Submersible 1220 ft**

Type of Pump: **Submersible** Pump Depth (ft.): **1220**

Well Tests: **Pump** **Yield: 50 GPM with 100 ft. drawdown after 36 hours**

Water Quality:

Strata Depth (ft.)	Water Type
1560	Drinking

Chemical Analysis Made: **Yes**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Central Texas Water Well**

P.O. Box 1184
Bowie, TX 76230

Driller Name: **Nelson Thomas** License Number: **1757**

Comments: **Amended 4/9/13 Added 773 sacks cement to annular seal data. Driller having problems with amendment request system - DT**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
1	30	Red & Yellow Clay
30	110	SD & Gravel
110	400	Gray Shale & Lime Rock
400	440	Lime Rock
440	700	Gray Shale & Lime Rock
700	770	SD
770	900	SDY Lime & SD
900	950	Lime Rock
950	1050	Shale & Lime Rock
1050	1100	Lime Rock
1100	1150	Shale & Lime Rock
1150	1190	SD
1190	1220	Lime Rock
1220	1270	Gray & Blue Shale
1270	1300	SD
1300	1360	Shale & Rock
1360	1430	Red Clay & Blue Shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
6 5/8 Cemented ground-1430' w/Cemented by Quasar Energy Services Inc.
3" Blank Liner 1346'-1430' w/Left hand Collar @ 1346'
3" Stainless Screen 1430'-1560' slot .020
Gravel Pack 1346'-1560' w/16-30 FRAC SD

1430	1560	SD

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P.O. Box 12157
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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #67239

Owner:	**Stroud Energy**	Owner Well #:	**H 1**
Address:	**210 W. 6 th St.; Suite 500** **Ft. Worth, TX 76102**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 06" N**
Well Location:	**Exit 17 & I 35** **Alvarado, TX 76009**	Longitude:	**097° 11' 05" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **9/15/2005** Drilling End Date: **9/15/2005**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	220

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
10	220	Gravel	16 mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	10	3 cement

Seal Method: **Measured & top loaded**

Sealed By: **Driller**

Distance to Property Line (ft.): **150**

Distance to Septic Field or other concentrated contamination (ft.): **0**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Estimated**

Surface Completion: **Surface Sleeve Installed**

Water Level: **50 ft.** below land surface on **2005-09-15** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Bailer** **Yield: 50+ GPM with 20 ft. drawdown after 1 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
N/A		

Water Quality:

Strata Depth (ft.)	Water Type
50-------220	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **R. B. Geyer**

License Number: **1505**

Apprentice Name: **Johnny Dennis**

Apprentice Number: **WWDAPP00000543**

Comments: **Amended 9/20/05 Ref.# 2163**

Report Amended on by Request #2163

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	10	Top soil
10	50	Clay & shale
50	58	Sand
58	117	Blue shale
117	150	Sand
150	160	Shale
160	205	Sand
205	220	Sandy shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 New Plastic 220-------0 sch 40
Slotted 220-----60 .030

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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #67240

Owner:	**Stroud Energy**	Owner Well #:	**H 2**
Address:	**210 W. 6 th St., Suite 500 Ft. Worth, TX 76102**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 09" N**
Well Location:	**I 35 & Exit 17 Alvarado, TX 76009**	Longitude:	**097° 11' 01" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **9/16/2005** Drilling End Date: **9/16/2005**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
8	0	220

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
10	220	Gravel	16 mesh

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	10	3 cement

Seal Method: **Measured & top loaded**

Sealed By: **Driller**

Distance to Property Line (ft.): **60**

Distance to Septic Field or other concentrated contamination (ft.): **0**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Measured**

Surface Completion: **Surface Sleeve Installed**

Water Level: **50 ft.** below land surface on **2005-08-16** Measurement Method: **Unknown**

Packers: **N/A**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Bailer** **Yield: 50+ GPM with 20 ft. drawdown after 1 hours**

Plug Information:

Description (number of sacks & material)	Top Depth (ft.)	Bottom Depth (ft.)
N/A		

Water Quality:

Strata Depth (ft.)	Water Type
220----50	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **R. B. Geyer**

License Number: **1505**

Apprentice Name: **Johnny Dennis**

Apprentice Number: **WWDAPP00000543**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	10	Top soil
10	50	Blue shale
50	58	Sand
58	117	Shale
117	150	Sand
150	160	Shale
160	205	Sand
205	220	Sandy shale

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 New Plastic 220------0 sch 40
Slotted 220----60 .030

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Texas Department of Licensing and Regulation
P.O. Box 12157
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(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #124357

Owner:	**Devon**	Owner Well #:	**Bill West**
Address:	**PO BOX 1340** **Bridgeport, TX 76426**	Grid #:	**32-47-1**
		Latitude:	**32° 20' 58" N**
Well Location:	**CO 2415** **Alvarado, TX**	Longitude:	**097° 13' 27" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **9/5/2007** Drilling End Date: **9/13/2007**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
14.75	**0**	**20**
11.625	**20**	**1640**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
1260	**1640**	**Gravel**	**16 / 30**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**20**	**10**
680	**800**	**100**

Seal Method: **Tremmie pipe**

Sealed By: **T. Rich**

Distance to Property Line (ft.): **50**

Distance to Septic Field or other concentrated contamination (ft.): **100**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Engineer**

Surface Completion: **Surface Slab Installed**

Water Level: **1209 ft.** below land surface on **2007-09-18** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **1386**

Well Tests: **Estimated** **Yield: 170 GPM with 70 ft. drawdown after 1 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	Fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Biffle Water Well**

PO BOX 1299
Gainesvill, TX 76240

Driller Name: **David Biffle** License Number: **2741**

Apprentice Name: **W. Spence** Apprentice Number: **3406**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	40	Rock shale
40	110	Sand shale
160	700	Sand and shale
700	780	Sand
780	1280	Lime rock
1280	1640	Sand rock

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
6 5/8 N Steel 020 screen 1440/1480 .020
6 5/8 N Steel blank 1480/1500 .250
6 5/8 N Steel 020 screen 1500/1560 .020
6 5/8 N Steel blank 1560/1580 .250
6 5/8 N Steel 050 screens 1580/1640 .020

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P.O. Box 12157
Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #30121

Owner:	**Jimmy & Claudia Atlas**	Owner Well #:	**# 2**
Address:	**4920 CR 401 Grandview, TX 76050**	Grid #:	**32-47-2**
		Latitude:	**32° 21' 13" N**
Well Location:	**8845 CR 107 Grandview, TX 76050**	Longitude:	**097° 10' 52" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Stock**

Drilling Start Date: **11/20/2003** Drilling End Date: **11/20/2003**

Borehole:

Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
7.875	0	220

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
180	220	Gravel	1/8"

Annular Seal Data:

Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
0	100	15 cement
165	180	9 bentonite

Seal Method: **Unknown**

Sealed By: **Driller**

Distance to Property Line (ft.): **1000+**

Distance to Septic Field or other concentrated contamination (ft.): **0**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Visual insp**

Surface Completion: **Surface Sleeve Installed**

Water Level: **140 ft.** below land surface on **2003-11-20** Measurement Method: **Unknown**

Packers: **none**

Type of Pump: **Submersible** Pump Depth (ft.): **200**

Well Tests: **Bailer** **Yield: 15+ GPM with 15 ft. drawdown after 1 hours**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	fresh

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Geyer Drilling Co. Inc.**

108 W. Broad St
Mansfield, TX 76063

Driller Name: **B. S. Harrison** License Number: **4789**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	16	Red sandy soil
16	18	Brown clay
18	43	Red sand
43	79	Gray shale
79	145	Gray sandy shale
145	170	Sand
170	181	Shale
181	197	Sand
197	208	Sand
208	215	Sand w/gravel streak
215	220	Hard sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
4	New	Plastic	220-----surf sch 40
Slotted			220----195

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Austin, TX 78711
(512) 334-5540

STATE OF TEXAS WELL REPORT for Tracking #153676

Owner:	**Molina, Servando**	Owner Well #:	**No Data**
Address:	**42225 Robinson** **Grand Prairie, TX 75052**	Grid #:	**32-47-2**
Well Location:	**9332 Wheatfield** **Grandview, TX 76050**	Latitude:	**32° 21' 13" N**
		Longitude:	**097° 10' 52" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Domestic**

Drilling Start Date: **5/20/2008** Drilling End Date: **5/20/2008**

	Diameter (in.)	Top Depth (ft.)	Bottom Depth (ft.)
Borehole:	7.875	0	180

Drilling Method: **Air Rotary**

Borehole Completion: **Filter Packed**

	Top Depth (ft.)	Bottom Depth (ft.)	Filter Material	Size
Filter Pack Intervals:	25	180	Gravel	

	Top Depth (ft.)	Bottom Depth (ft.)	Description (number of sacks & material)
Annular Seal Data:	-1	25	6

Seal Method: **Pressure**

Sealed By: **Jimmy**

Distance to Property Line (ft.): **25**

Distance to Septic Field or other concentrated contamination (ft.): **120**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Owner**

Surface Completion: **Surface Sleeve Installed**

Water Level: **25 ft.** below land surface on **2008-05-20** Measurement Method: **Unknown**

Packers: **None**

Type of Pump: **Submersible** Pump Depth (ft.): **160**

Well Tests: **Estimated** **Yield: 10 GPM**

Water Quality:

Strata Depth (ft.)	Water Type
No Data	No Data

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **No**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Jimmy D. Miller**

333 PR 4197
Decatur, TX 76234

Driller Name: **Jimmy D. Miller** License Number: **2436**

Comments: **^EO**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	10	topsoil & yellow clay
10	25	blue shell
25	70	sand & blue shell
70	100	blue shell
100	180	blue shell

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.) New/Used Type Setting From/To (ft.)
4 1/2" N Plastic +2'-180'
Perf. 40'-180'

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P.O. Box 12157
Austin, TX 78711
(512) 334-5540

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Paluxy Field No. _____ State Well No. 32-47-101

Owner's Well No. _____ County Johnson

1. Location: ____ 1/4, ____ 1/4 Sec. _____, Block _____ Survey _____

2. Owner: Sherman Wright Address: Box 203, Alvarado, Texas

Tenant: _____ Address: _____

Driller: Ward & Ward Drilling Co. Address: _____

3. Elevation of LSD is 755 ft. above msl, determined by Topo.

4. Drilled: 5-15 1964; Dug, Cable Tool, Rotary

5. Depth: Rept. 795 ft. Meas. _____ ft.

6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed

7. Pump: Mfgr. _____ Type Subm

No. Stages _____, Bowls Diam. _____ in., Setting 588 ft.

Column Diam. _____ in., Length Tailpipe _____ ft.

8. Motor: Fuel Elect. Make & Model _____ HP. 2

9. Yield: Flow _____ gpm, Pump 10 gpm, Meas., Rept., Est.

10. Performance Test: Date _____ Length of Test _____ Made by _____

Static Level _____ ft. Pumping Level _____ ft. Drawdown _____ ft.

Production _____ gpm Specific Capacity _____ gpm/ft.

11. Water Level 465.0 ft. rept. meas. 5-19 1964 above below LSD which is _____ ft. above below surface.

400.97 ft. rept. meas. 2-22 1971 above below hole in steel plate which is 1.0 ft. above below surface.

_____ ft. rept. meas. _____ 19__ above below which is _____ ft. above below surface.

_____ ft. rept. meas. _____ 19__ above below which is _____ ft. above below surface.

12. Use: Dom., Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used, Historical

13. Quality: (Remarks on taste, odor, color, etc.)

Temp. — °F, Date sampled for analysis 8-3-66 Laboratory USGS

Temp. — °F, Date sampled for analysis 5-28-70 Laboratory TSDH

Temp. — °F, Date sampled for analysis 7-15-76 Laboratory do

14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test,

15. Record by: Gene Davis Date 2-10-1976

Source of Data Obs. Folder + obs.

16. Remarks:

CASING & BLANK PIPE

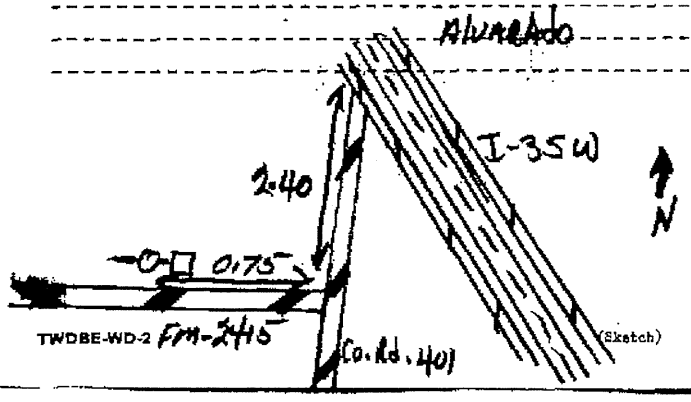
Cemented From 0 ft. to 795 ft.

Diam. (in.)	Type	Setting, ft. from	to
4½	Steel	0	795

WELL SCREEN

Screen Openings _____

Diam. (in.)	Type	Setting, ft. from	to
4½	Gun Perf.		



TWDBE-WD-2 FM-2415

(Sketch)

32-47-101

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Paluxy Field No. _____ State Well No. 32-47-101

Owner's Well No. _____ County Johnson

1. Location: ___ 1/4, ___ 1/4 Sec. _____, Block _____ Survey _____

2. Owner: Sherman Wright Address: Box 203, Alvarado, Texas

Tenant: _____ Address: _____

Driller: Ward & Ward Drlg Co Address: _____

3. Elevation of 454 is 755 ft. above msl, determined by Topo

4. Drilled: 5-14 19 64; Dug, Cable Tool, (Rotary)

5. Depth: Rept. 795 ft. Meas. _____ ft.

6. Completion: Open Hole, (Straight Wall) Underreamed, Gravel Packed

7. Pump: Mfgr. _____ Type Subm.

No. Stages _____, Bowls Diam. ___ in., Setting 588 ft.

Column Diam. _____ in., Length Tailpipe _____ ft.

8. Motor: Fuel Elec Make & Model _____ HP. 2

9. Yield: Flow ___ gpm, Pump 10 gpm, Meas. (Rept.) Est.

10. Performance Test: Date _____ Length of Test _____ Made by _____

Static Level ___ ft. Pumping Level ___ ft. Drawdown ___ ft.

Production _____ gpm Specific Capacity _____ gpm/ft.

CASING & BLANK PIPE Cemented From 0 ft. to 795 ft.

Diam. (in.)	Type	Setting, ft. from	to
4½	steel	0	795

11. Water Level: 465 ft. (rept. meas.) 5-14 1964 above below surface.

400.60 ft. (rept. meas.) 8-3 1966 above (below) hole in casel/tank which is 1.00 ft. (above) below surface.

_____ ft. rept. meas. _____ 19__ above below which is ___ ft. above below surface.

_____ ft. rept. meas. _____ 19__ above below which is ___ ft. above below surface.

12. Use: (Dom), Stock, Public Supply, Ind., Irr., Waterflooding, Observation, Not Used, _____

13. Quality: (Remarks on taste, odor, color, etc.) _____

Temp. ___ °F, Date sampled for analysis 8-3-66 Laboratory USGS

Temp. ___ °F, Date sampled for analysis 5-28-70 Laboratory TSDH

Temp. ___ °F, Date sampled for analysis 7-15-76 Laboratory "

WELL SCREEN Screen Openings

Diam. (in.)	Type	Setting, ft. from	to
4½	shot PERF		

14. Other data available as circled: (Driller's Log), Radioactivity Log, Electric Log, Formation Samples, Pumping Test,

15. Record by: Gene Davis Date 2-10 1975

Source of Data obs Folder 4065

16. Remarks: Under 12' high round galvanized cover TWDB Rept-94

Obs Well

see obs. well Folder

Historical ~~obs. well~~

32-47-101

TWDBE-WD-2 (Sketch)

WRD Exp. (GW)
April 1966

Well No. PX 32-47-101

WELL SCHEDULE

5 SSW Alvarado

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

Record by: Geo. Shafer — Source of data: Drillers' log — Date: 8-3-66 — Map: Grandview Quad. 1:24000

State: Texas [49] — County (or town): Johnson [PX]

Latitude: 32 20 51 V (deg, min, sec) — Longitude: 097 13 36 (degrees, min, sec) — Sequential number: 1

Lat-long accuracy: [ ] T. ___ N S, R ___ E W, Sec ___, ___ ¼, ___ ¼, ___ ¼ ___ B & M

Local well number: PX 32 47 101 — Other number:

Local use: — Owner or name: Sherman Wright

Owner or name: SHERMAN WRIGHT — Address: Box 203 Alvarado, Texas

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — P

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — D

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — W

DATA AVAILABLE: Well data [ ] — Freq. W/L meas.: [ ] — Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: Partial (8-3-66) [ ]

Freq. sampling: [ ] — Pumpage inventory: yes no period: [ ]

Aperture cards: yes [ ]

Log data: Drillers log - USGS file

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD — Depth well: 795 ft [795] — Meas. rept. D. log accuracy [6]

Depth cased (first perf.): ___ ft — Casing type: ___ ; Diam. 4½ in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf, (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — P

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: 1964 [964] — Pump intake setting: 588 ft [588]

Driller: Ward & Ward Drlg. Co. (name, address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — S — Deep Shallow [D]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 2 — T — Trans. or meter no.

Descrip. MP: Hole in cover plate 1 ft above/below LSD, Alt. MP

Alt. LSD: 755 ✓ [0 5 5 5 5] — Accuracy (source): [illegible] map [3]

Water Level: 400.6 ft above/below MP; Ft. above/below LSD [400] — Accuracy: Measured [D]

Date meas: 8-3-66 [2 5 5] — Yield: 10 gpm [0 0 0 1 0] — Method determined [ ]

Drawdown: ___ ft — Accuracy: [ ] — Pumping period ___ hrs

QUALITY OF WATER DATA: Iron ___ ppm — Sulfate 109 ppm — Chloride 27 ppm — Hard. 4 ppm

Sp. Conduct 1260 K x 10⁵ — Temp. — °F — Date sampled 8-3-66 [9 6 6]

Taste, color, etc. ph 8.0, SAR 66

Well No. PX-32-47-101

11-07-69 — 08 [illegible]

Jeep

Well No. PX 32-47-101

Latitude-longitude N S
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD (1–19) Physiographic Province: (20–21) Section:

Drainage Basin: (22–25) Subbasin: (26)

Type of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (Ø) offshore, (P) pediment, (B) hillside, (T) terrace, (U) undulating, (V) valley flat (27)

MAJOR AQUIFER: Cretaceous (system) Comanche (series) K (28–29) Paluxy (aquifer, formation, group) (30–31)

Lithology: Sand (32–33) Origin: S (34) Aquifer Thickness: ft

(35–37) Length of well open to: ft (38–40) Depth to top of: ft (41–43)

MINOR AQUIFER: (system) (series) (44–45) (aquifer, formation, group) (46–47)

Lithology: (48–49) Origin: (50) Aquifer Thickness: ft

(51–53) Length of well open to: ft (54–56) Depth to top of: ft (57–59)

Intervals Screened: ?

Depth to consolidated rock: ft (60–63) Source of data: (64)

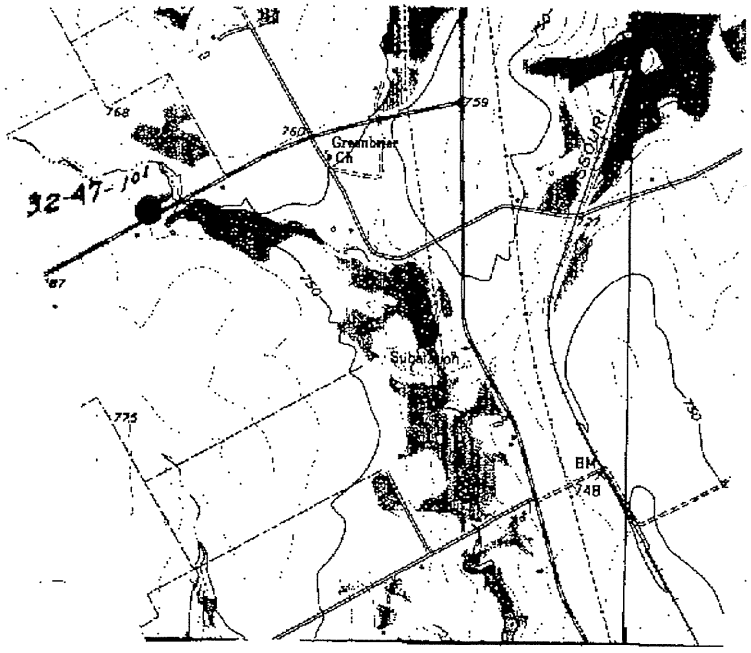
Depth to basement: ft (65–68) Source of data: (69)

Surficial material: (70–71) Infiltration characteristics: (72)

Coefficient Trans: gpd/ft (73–75) Coefficient Storage: (76–78)

Coefficient Perm: gpd/ft²; Spec cap: gpm/ft; Number of geologic cards: (79)

Cty. Com from O-795



Well No. PX 32-47-101

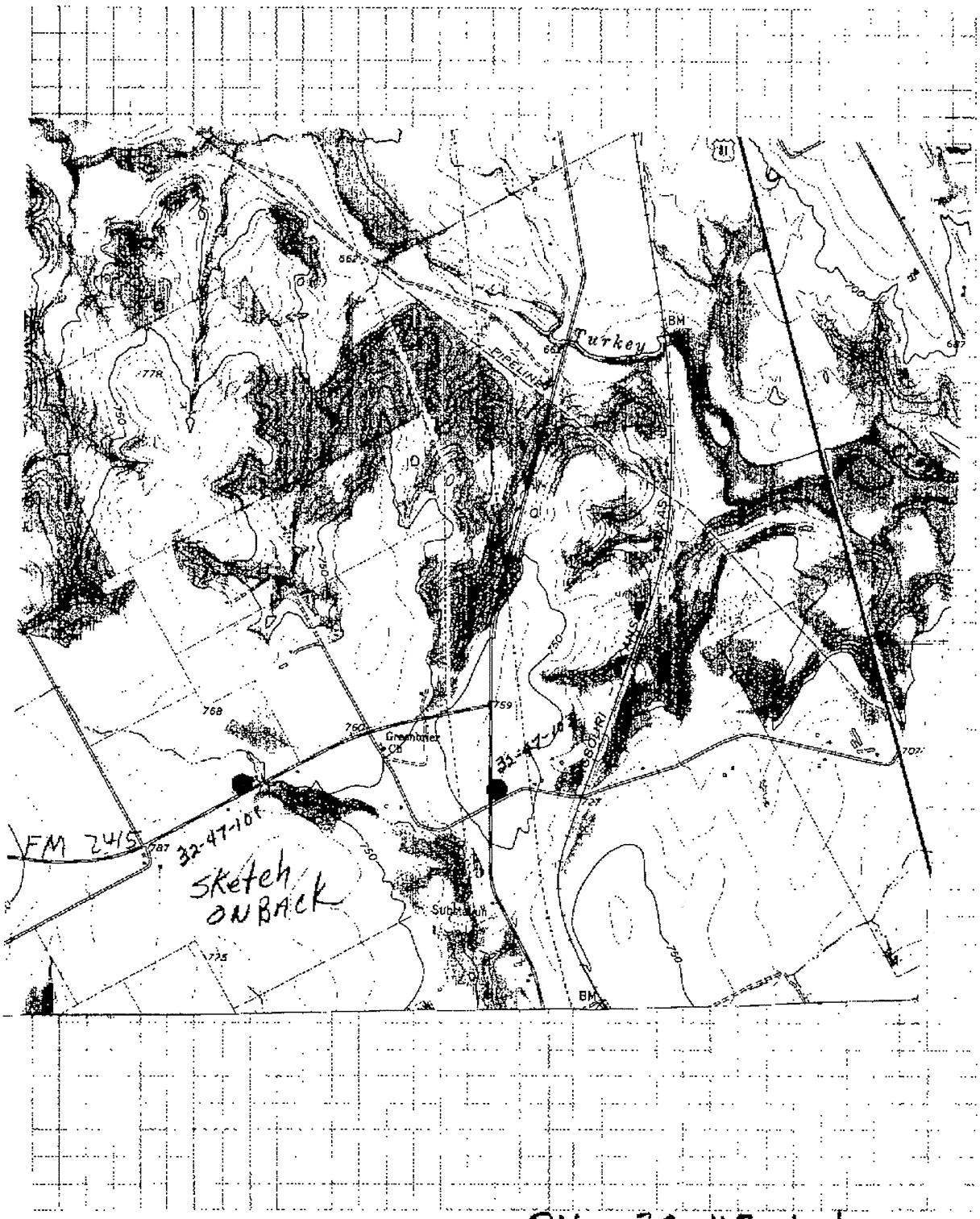
GPO 857-700

TEXAS WATER DEVELOPMENT BOARD

BY_____ DATE_____ DIVISION _____ SHEET NO._____ OF_____

CHKD_____ DATE_____ JOB NAME _____

_____ JOB NO._____ PROG. CODE_____



TWDB8-9-3

PX 32-47-101

File original copy with
Texas Water Commission
P. O. Box 2311, Capitol Station
Austin 11, Texas

State of Texas

DRILLERS LOG AND WELL DATA REPORT

For use by TWC only
Well No. [illegible]
Located on map [illegible]
By [illegible] Date [illegible]
Map No. 127

1) Well Owner: Sherman Wright (Name) Alvarado Texas (Street or RFD) (City) (State)

2) Land Owner: Same (Name) (Street or RFD) (City) (State)

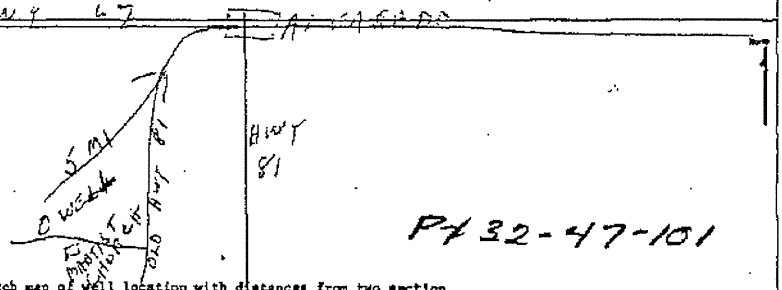
3) Intended use: Industrial ☐ ;Municipal ☐ ;Irrigation ☐ ;Other Home

4) Location of well: County Johnson Labor ____ League ____ Abstract No. ____

NW¼ NE¼ SW¼ SE¼ of Section ____ Block No. ____ Survey ____
(Circle as many as are known)

5 miles in S.S.W (NE, SW, etc) direction

from Alvarado (Town)



PX 32-47-101

Sketch map of well location with distances from two section or survey lines, and to landmarks, roads, and creeks.

DRILLERS LOG OF WELL

Method of drilling: Rotary Diameter of hole 6 in. Date drilled 5/14/64

All measurements made from ____ ft. above ground level.

From (ft)	To (ft)	Description and color of formation material	From (ft)	To (ft)	Description and color of formation material
0	3	Top Soil	265	370	Limestone 790 — 795 Sand
3	65	Shale	370	504	Shale
65	75	Sand	504	638	Limestone
75	126	Shale	638	650	Shale
126	146	Sand	650	705	Limestone
146	154	Shale	705	750	Shale
154	174	Sand	750	758	Pulxxy Sand
174	265	Shale	758	790	Shale (Use continuation sheets if necessary)

COMPLETION DATA

COMPLETION

Straight well ☐
Under reamed ☐
Gravel packed ☐
Open hole ☐
Other Shot Perforated

CASING

Type: Old ☐ New ☒
Cemented from 0 ft.
to 795 ft.

Diameter (inches)	Setting from (ft)	Setting to (ft)
4½	0	795

SCREEN

Type ____
Perforated ☐ Slotted ☐

Diameter (inches)	Setting from (ft)	Setting to (ft)

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

V.O.Ward Partner (Signature) V.O. Ward Ward & Ward Drilling Co. (Company Name) Reg. No. 247

Please attach electric log, chemical analysis, and other pertinent information if available.

If well was tested by your company or if you installed the permanent pump please complete the following:

WATER LEVEL AND PUMP DATA

Static water level 465
ft. below Surface

Pumping level

feet	hours	gpm

Pump type Submergible
Designed pumping rate 10 gpm ☒ gph ☐
Type power unit Electric
Horsepower 2
Depth to bowls, cylinder, jet, etc., 588 ft. below pump base.

Name of contractor testing well or installing permanent pump if other than your company: PX 32-47-101

C-34 (62-4)

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDB ONLY
Organization No. 422 Lab No. 01
Work No. 6042 IAC(86-87) 1585

CHEMICAL WATER ANALYSIS REPORT

Send Reply To:
Water Availability Data and Studies Section
Texas Water Development Board
Stephen F. Austin Building
1700 Congress Ave.
Austin, Texas 78711
Attn: F. Gilberry Rm. 3040 MBS

County 126 Johnson
State Well No. 32-47-101
Well No.
Date Collected 07-30-87

Owner Sherman Wright ✓ Send copy to owner Sample No. By F. Gilberry
Address Box 203 Alvarado, Tx. Well Location
Date Drilled 5-15-64 Depth 795 ft. WBF Belvy-158 Source (type of well) Subm.
Producing intervals Water level ft. Sample depth ft.
Sampled after pumping 5 min. hrs. Yield GPM (meas. est.) Temperature 76 °F °C
Point of collection Valve on pressure tank Appearance ✓ clear ☐ turbid ☐ colored ☐ other
Use Dom. Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

Laboratory No. [redacted] Date Received JUL 31 '87 Date Reported AUG 24 '87

KEY PUNCHED

WATER ANALYSIS
State Well No:32-47-101 Date:081887 Sample No:EB7-1927

	MG/L	ME/L		MG/L	ME/L
Silica:00955:	11		Carbonate:00445:	15	0.50
Calcium:00915:	1	0.08	Bicarbonate:00440:	590	9.68
Magnesium:00925:	<1	0.02	Sulfate:00946:	111	2.31
Sodium:00930:	310	13.48	Chloride:00940:	29	0.82
Potassium:00935:	1.0	0.03	Fluoride:00950:	3.8	0.2
T.Cations		13.60	Nitrate as NO3:71851:	.13	0.00
Manganese:01055:		%Na	T. Anions		13.53
			pH:00403:	8.6	
Boron:01020:		SAR			
			TDS(Calc):70301:	774	
Total Iron:01045:		RSC	P. Alk.:00415:	13	
Other			T. Alk.:00410:	510	
(Specific Cond.:00095:		1060	T. Hardness:00900:	5	

Diluted Conductance (micromhos/cm3)
10 x136 =1360

__ items will be analyzed if checked.

Ammonia-N:00610:
Nitrite-N:00615:
Nitrate-N:00620:
OrganicNitrogen:00605:

TWDB-0811 (Rev.02-27-86)

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
~~Do not use ball point pen~~

Texas State Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE-GW ONLY
Program No. _____
Proj. No. 3162

CHEMICAL WATER ANALYSIS REPORT

County 126 Johnson
State Well No. 32-47-101
— Well No. —
Date Collected 07-15-76
By Gene Davis

Send report to:

Ground Water Data and Protection Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

Location _____
Source (type of well) Subm-Elect. Owner Sherman Wright
Date Drilled 5-15-64 Depth 795 ft. WBF Paluxy
Producing intervals — Water level — ft.
Sampled after pumping — hrs. Yield 10 GPM Temperature °F °C
Point of collection Pressure Tank Appearance ☒ clear ☐ turbid ☐ colored ☐ other
Use D+S Remarks Send Copy To: Sherman Wright, Box 203, Alvarado, Texas

(FOR LABORATORY USE ONLY)
315889

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. _____ Date Received JUL 19 1976 Date Reported JUL 28 1976

	MG/L	ME/L
Silica	11	
Calcium	3	0.17
Magnesium	<1	0.01
Sodium	307	13.36
Total		13.44
☐ Potassium	.	
☐ Manganese	.	
☐ Boron	.	
3/☐ Total Iron	.	
☐ (other) _____ MG/L		

%Na _____
SAR _____
RSC _____

Specific Conductance (micromhos/cm³) 1210
Diluted Conductance (micromhos/cm³) 10 x 135
1350

	MG/L	ME/L
Carbonate	12	0.40
Bicarbonate 295	600	9.84
Sulfate	108	2.25
Chloride	29	0.82
Fluoride	3.9	0.21
Nitrate	1.8	.
pH	8.6	
Total		13.52

1/ Dissolved Solids (sum in MG/L)		770
Phenolphthalein Alkalinity as $CaCO_3$	0.20	10
Total Alkalinity as $CaCO_3$	10.24	510
Total Hardness as $CaCO_3$	0.18	9

2/ Nitrogen Cycle

Ammonia - N	.
Nitrite - N	.
Nitrate - N	.
Organic Nitrogen	.

"☐" items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-WD-1 (Rev. 12-5-72)

Analyst _____ Checked By _____

TWDBE-GW ONLY

ogram No. 7421

Proj. No.

CHEMICAL WATER ANALYSIS REPORT

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas State Department of Health Laboratories
1100 West 49th Street
Austin 5, Texas

Send report to:

Ground Water Division
Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

County JOHNSON

State Well No. PX 32-47-101

Well No.

Date Collected 5-28-70

For: A.N. WYATT By: H.D. DAVIDSON

Location NORTH OF H.W 2415

Source (type of well) SUBM. Owner SHERMAN WRIGHT

Date Drilled 1964 Depth 795 ft. WBF

Producing intervals Water level 396.50 ft.

Sampled after pumping hrs. Yield GPM Meas. est. Temperature 69 °F °C

Point of collection FAUCET AT WELL Appearance CLEAR
clear - turbid - colored

Use DOM. Remarks

FOR LABORATORY USE ONLY

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. 158102 W Date Received JUN 1 1970 Date Reported JUN 11 1970

	MG/L	ME/L		MG/L	ME/L
Silica	10		Carbonate	7	0.24
Calcium	2	0.10	Bicarbonate	610	9.92
Magnesium	2	0.13	Sulfate	113	2.36
Sodium	302	13.14	Chloride	27	0.77
	Total	13.37	Fluoride	4.4	
☐ Potassium			Nitrate	<0.4	
☐ Manganese		%Na	pH 8.4		Total 13.29
☐ Boron		SAR	1/ Dissolved Solids (sum)		770
☐ Total Iron		RSC	Phenolphthalein Alkalinity as C aCO_3		(0.12) 6
☐ (other)			Total Alkalinity as C aCO_3		(10.16) 510
Specific Conductance (micromhos/cm³)		1167	Total Hardness as C aCO_3		(0.23) 12
Diluted Conductance (micromhos/cm³)		9 x 147			
"☐" items will be analyzed if checked.		1323	Analyst		
Total Iron requires separate sample.			Checked by		

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.

TWDBE-GW-50

JUN 11 1970

Geological Survey

01134

UNITED STATES DEPARTMENT OF THE INTERIOR
Ground Water Analysis

KEY Ppunched

Water Resources Division
Austin, Texas

State: Texas 41 | County: Johnson | PX Well No. | Latitude 32 20 51 N | Longitude 097 13 36 | Seq. No. 1 | Date M 08 D 03 Y 66 | Sampling Depth | Type Partial

Local Well No. PX 32-47-101 Location 5 SSW Alvarado
Owner Sherman Wright, Box 203, Alvarado Date drilled: 1964 Depth: 795 WBF Paluxy Prod. Intervals Water level 600.6 strat
Sampled after pumping Yield GPM Pt. of coll. Appearance clear Use dom. Collector Shafer

	ppm	epm
K x 10^6		
K KCl 355 K sample 282	1260	
pH	8.1	
Temperature °F		
Density at 20°C		
310 5 ml A sample .425	11	
Al ml A 0.00250 mg .00625 mg .0125 mg .025 mg Sample		
Fe A 0.025 mg ml Sample Total ml Sample Diss.		
Mn Total Dissolved		
ml	107	.03
epm Ca + Mg .07 0.5 epm Ca epm Mg	105	.04
30.7	3021	13.14
Na + K Calc.		
1.8 1.000	118	.05
Percent error -0.7 Total cations		13.26

	ppm	epm
HCO_3 25 ml 15.55	622	10.19
Total Alk as CO_3 306		
CO_3 .25 ml	01	.00
SO_4 10 ml	1091	2.27
Blk		
Std		
Sample 1.36		
Cl 5 ml 2.74	271	.76
Source 79	Card No. 80 0	
F 5 ml 1.90 ±2: A 1.00 ppm 2.00 ppm A sample .720	138	.20
NO_3 .45 ml std. 14 ml A Sample A ml std A ml std Factor	32	.04
NO_2 ml A 0.01 mg .02 mg .05 mg Sample	ppm	
PO_4 ml Ortho Total A 0.0050 mg .0100 mg .0250 mg .0500 mg Sample		
Total anions		13.46

Equivalents per million

Na+K — Cl
Ca — HCO_3+CO_3
Mg — SO_4

B A mg ml mg mg mg

Al	
Fe	
Mn	
Cu	
Pb	
Zn	
Dissolved solids: Determined	
Calculated	764
Hardness ml epm Ca + Mg .07 epm Alk 10.19 epm NCH .00	
Ca+Mg	4
NCH	00
Color	
Card No.	8
Br	
I	
Alk. as $CaCO_3$	
Free CO_2	
Percent Na 99	
SAR	66
RSC	10
MRAS	
NO_2	
Card No.	5

Analyst FREEMAN ANDREW Checked by C.A.K.
Date begun AUG 2 2 Completed AUG 31 1966

Transmittals	Date
Records processing----	
Collector----	OCT 10 1966
Owner----	

KEY PUNCHED

Recorded by: Punched by: Date:

IIIG-A-185

TEXAS WATER DEVELOPMENT BOARD — WATER LEVEL MEASUREMENTS

AS OF 02-24-78

OWNER -

LOCATION - 32-21-00N
097-13-40W

MEASURING POINT DESCRIPTION -

STATE WELL NUMBER PX-32-47-101 — LAND SURFACE DATUM ELEVATION 755.00

DEPTH OF WELL 795 — COMPLETION INTERVAL

DATE OF CURRENT MEASUREMENT MO.	DAY	YR.	CURRENT DEPTH TO WATER FROM LSD IN FEET	DATE OF LAST MEASUREMENT MO.	DAY	YR.	PREVIOUS MEASUREMENT IN FEET	CHANGE IN LEVEL SINCE THE LAST MEASUREMENT	MEASURING AGENCY	MEASUREMENT METHOD	REMARKS	WELL USE	M P	DEPTH TO WATER FROM M P
08	03	66	399.60						99	1		2	+1.00	400.60
05	28	70	396.80	08	03	66	399.60	+2.80	01	1	08	2	+1.00	397.80
02	22	71	400.37	05	28	70	396.80	-3.57	01	1	08	2	+1.00	401.37
11	02	71							01		13	2	+1.00	
11	20	72							01		13	2	+1.00	
11	09	73							01		15	2	+1.00	
11	11	74							01		13	2	+1.00	
11	05	75							01		13	2	+1.00	

YR. REC. BEGINS 66 — AQUIFER 138 — COUNTY 126 — WATERSHED 08

OLD WELL NUMBER — COUNTY - JOHNSON — HISTORICAL 32-47-101

STATE OF TEXAS WELL REPORT for Tracking #112232

Owner:	**Devon Energy**	Owner Well #:	**Haliburton 1H**
Address:	**PO Box 248** **Bridgeport, TX 76426**	Grid #:	**32-47-1**
		Latitude:	**32° 22' 04" N**
Well Location:	**County Rd 401** **Alvarado, TX**	Longitude:	**097° 13' 11" W**
Well County:	**Johnson**	Elevation:	**No Data**
Type of Work:	**New Well**	Proposed Use:	**Rig Supply**

Drilling Start Date: **3/19/2007** Drilling End Date: **3/30/2007**

Borehole:

Diameter (in.)	*Top Depth (ft.)*	*Bottom Depth (ft.)*
11.375	**0**	**1550**

Drilling Method: **Mud (Hydraulic) Rotary**

Borehole Completion: **Filter Packed**

Filter Pack Intervals:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Filter Material*	*Size*
1200	**1550**	**Gravel**	**12/20**

Annular Seal Data:

Top Depth (ft.)	*Bottom Depth (ft.)*	*Description (number of sacks & material)*
0	**20**	**20sx cmt**
600	**770**	**100 sx cmt**

Seal Method: **Trimmie pipe**

Sealed By: **B. Vanhoose**

Distance to Property Line (ft.): **150+**

Distance to Septic Field or other concentrated contamination (ft.): **150+**

Distance to Septic Tank (ft.): **No Data**

Method of Verification: **Engineer**

Surface Completion: **Surface Slab Installed**

Water Level: **1200 ft.** below land surface on **2007-04-02** Measurement Method: **Unknown**

Packers: **No Data**

Type of Pump: **Submersible** Pump Depth (ft.): **1340**

Well Tests: **Unknown** **Yield: 150 GPM with 100 ft. drawdown after 2 hours**

Water Quality:

Strata Depth (ft.)	Water Type
1450	Good

Chemical Analysis Made: **No**

Did the driller knowingly penetrate any strata which contained injurious constituents?: **Unknown**

Certification Data: The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the report(s) being returned for completion and resubmittal.

Company Information: **Biffle Water Well Service**

PO Box 1299
Gainesville, TX 76241

Driller Name: **David Biffle** License Number: **2741**

Apprentice Name: **Charles Pratt** Apprentice Number: **1690**

Comments: **No Data**

Lithology:
DESCRIPTION & COLOR OF FORMATION MATERIAL

Top (ft.)	Bottom (ft.)	Description
0	80	Top Soil
80	180	Wood bine water sand
180	650	Lime stone / shale
650	750	Plux. water sand
750	1200	Lime stone / shale
1200	1290	Trinity water sand
1290	1350	Shale
1350	1370	Trinity water sand
1370	1450	Shale
1450	1550	Trinity water sand

Casing:
BLANK PIPE & WELL SCREEN DATA

Dia. (in.)	New/Used	Type	Setting From/To (ft.)
6 5/8	N	Blank	Steel 0-1210
6 5/8	N	Blank	Screen 1210-1290 .020
6 5/8	N	Blank	Steel 1290-1350
6 5/8	N	Blank	Screen 1350-1370 .020
6 5/8	N	Blank	Steel 1370-1450
6 5/8	N	Blank	Screen 1450-1550 .020

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking Number on your written request.

Texas Department of Licensing and Regulation
P.O. Box 12157
Austin, TX 78711
(512) 334-5540

ONSITE WATER WELL REPORT

Please use black ink. Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

1) OWNER JOHNSON COUNTY LANDFILL (Name) Address DRAWER 2 ALAVARDO, TEXAS 76009 (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL:
County JOHNSON 4 miles in N (N.E., S.W., etc.) direction from GRANDVIEW (Town)

Drillers must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or furnish locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. _____ Block No. _____ Township _____
Abstract No. _____ Survey Name _____
Distance and direction from two intersecting section or survey lines _____
☒ See attached map.

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☐ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☒ Other OFFICE

5) DRILLING METHOD (Check): ☐ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☒ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other _____

6) WELL LOG:
Date drilled 3-4-86

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 3/4	Surface	200

7) BOREHOLE COMPLETION: ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☒ Other pressure cemented
If Gravel Packed give interval ... from _____ ft. to _____ ft.

From (ft.)	To (ft.)	Description and color of formation material
0-2		surface
2-12		clatchy -dirt
12-125		shale
125-135		sand
135-140		shale
140-174		sand
174-200		shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4½	N	steel	0	200	156
4½	N	slotted	160	200	1/8

9) CEMENTING DATA (Rule 319.44(b))
Cemented from 0 ft. to 160 ft.
_____ ft. to _____ ft.
Method used mud pump
Cemented by MCPHERSON DRILLING CO.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed (Rule 319.44(c))
☐ Pitless Adapter Used (Rule 319.44(d))
☒ Approved Alternative Procedure Used (Rule 319.71)

11) WATER LEVEL:
Static level 111 ft. below land surface Date 3-4-86
Artesian flow _____ gpm. Date _____

12) PACKERS: Type Depth

13) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other _____
Depth to pump bowls, cylinder, jet, etc., 126 ft.

14) WELL TESTS:
Type Test: ☐ Pump ☒ Bailer ☐ Jetted ☐ Estimated
Yield: 24 gpm with 30 ft. drawdown after 1 hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? WOODBINE Depth of strata 34
Was a chemical analysis made? ☐ Yes ☒ No

I have by certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME MCPHERSON DRILLING COMPANY (Type or Print) Water Well Driller's License No. 2460

ADDRESS GLEN ROSE STAR ROUTE BOX 90-A GLEBURNE, TEXAS 76031 (Street or RFD) (City) (State) (Zip)

(Signed) [signature] (Licensed Water Well Driller) (Signed) _____ (Registered Driller Trainee)

For TDWR use only
Well No. _____
Located on map _____

Please attach electric log, chemical analysis, and other pertinent information, if available.

DRILLER'S COPY

TDWR 0302 (12/20/73)

Plate 11a-I.2

GEOSEARCH OIL AND GAS WELL REPORT

GeoSearch

On time. On target. In touch.™

Oil & Gas Report

GeoLens by GeoSearch

Target Property:

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Johnson County, Texas 76009

Prepared For:

Weaver Consultants Group-Benbrook

Order #: 169781
Job #: 423284
Date: 09/13/2021

Table of Contents

Target Property Summary 1

Database Radius Summary 2

Oil & Gas Well/Pipeline Map 3

Oil & Gas Pipeline Report 4

Located Sites Summary 11

Site Summary By Database 14

Oil & Gas Well Report 17

Environmental Records Definitions 18

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Target Property Summary

Target Property Information

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Texas 76009

Coordinates
Area centroid (-97.203487, 32.3545082)

USGS Quadrangle
Grandview, TX

Geographic Coverage Information

County/Parish: Johnson (TX)
ZipCode(s):
Alvarado TX: 76009
Grandview TX: 76050

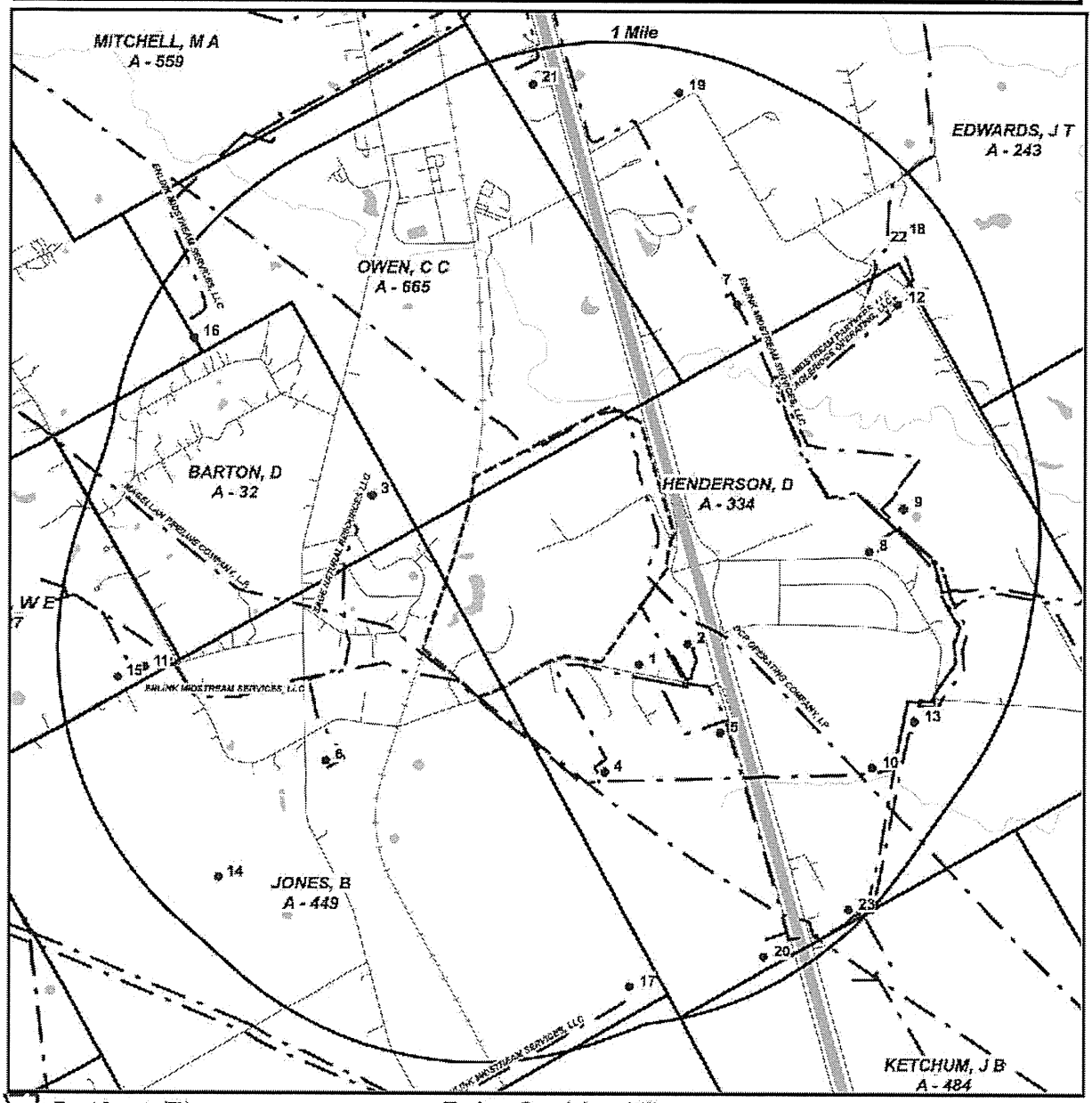
Database Radius Summary

STATE (TX) LISTING

Acronym	Search Radius (miles)	TP/AP (0 - 0.02)	1/8 Mile (> TP/AP)	1/4 Mile (> 1/8)	1/2 Mile (> 1/4)	1 Mile (> 1/2)	> 1 Mile	Total
OG	1.0000	0	2	1	10	29	NS	42
STCV	1.0000	0	0	0	0	0	NS	0
SUB-TOTAL		0	2	1	10	29	0	42
TOTAL		0	2	1	10	29	0	42

NOTES:
NS = NOT SEARCHED
TP/AP = TARGET PROPERTY/ADJACENT PROPERTY

OIL & GAS WELL/PIPELINE MAP



Target Property (TP)

Surface Location

Pipeline

Survey Line

Turkey Creek Landfill
9100 South I-35 W
Alvarado, Texas
76009

N
W E
S

0 1100' 2200 3300

SCALE: 1" = 2200'

Oil & Gas Pipeline Report

T4 PERMIT #	OPERATOR	SYSTEM NAME	COMMODITY	DIAMETER(Inches)	STATUS	TYPE	PIPELINE ID#
09746	TARGA DOWNSTREAM LLC	GRAND PRIX	HIGHLY VOLATILE LIQUID	30.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	GPX-E
09746	TARGA DOWNSTREAM LLC	GRAND PRIX	HIGHLY VOLATILE LIQUID	30.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	GPX-E
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	8.63	ABANDONED	GAS GATHERING	TC-101-B-10
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	8.63	ABANDONED	GAS GATHERING	TC-101-B-10
08714	EAGLERIDGE OPERATING, LLC	STAPLES JAVEED	NATURAL GAS	4.50	ABANDONED	GAS GATHERING	NOT REPORTED
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	14.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	22177
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	14.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	22177
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	TC-101-B-02-01
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	6.63	ABANDONED	GAS GATHERING	TC-101-B-02
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	TC-101-B-05-01-01
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	TC-101-B-03-01
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	TC-101-07-01
01693	XTO ENERGY INC.	BARNETT SHALE	NATURAL GAS	2.38	IN SERVICE	GAS GATHERING	XB2927
09746	TARGA DOWNSTREAM LLC	GRAND PRIX	HIGHLY VOLATILE LIQUID	30.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	GPX-E
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	TC-101-B-05-01
06722	UPP OPERATING, LLC	JOHNSON COUNTY WEST SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	RHOME ESTATES SALES
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24521
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24564
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24564
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	25170
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24999
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	12.75	IN SERVICE	GAS GATHERING	24887
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24960
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24783
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24563
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24860
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24510
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24510
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	25156
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24588

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24828
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24565
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24758
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25205
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24503
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24514
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24789
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	8.63	ABANDONED	GAS GATHERING	TC-101-B-10
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24862
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	TC-101-B-02
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25150
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24589
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25174
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	TC-101-04-A
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	ABANDONED	GAS GATHERING	TC-101-B-02-02
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	4.50	ABANDONED	GAS GATHERING	TC-101-B-03-01-01
06337	ENLINK MIDSTREAM SERVICES, LLC	NORTH TEXAS GATHERING SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	TC-101-04
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24567
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24990
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24687
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	25021
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25167
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24605
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24514
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24606
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24718
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	25156
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24776

Oil & Gas Pipeline Report

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24622
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24668
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24793
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24776
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
91578	ATMOS PIPELINE - TEXAS	M	NATURAL GAS-DISTRIBUTION	10.75	IN SERVICE	UNKNOWN TYPE	1268
91578	ATMOS PIPELINE - TEXAS	M	NATURAL GAS-DISTRIBUTION	6.63	IN SERVICE	UNKNOWN TYPE	1268
07084	ENERGY TRANSFER COMPANY	BASHAM-BROWNLEE	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24830
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24987
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	3.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
91578	ATMOS PIPELINE - TEXAS	M	NATURAL GAS-DISTRIBUTION	10.75	IN SERVICE	UNKNOWN TYPE	1268
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	3.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	25254
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	25178

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24623
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	20.00	IN SERVICE	GAS GATHERING	24529
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	12.75	IN SERVICE	GAS GATHERING	NOT REPORTED
06515	WILLIAMS MLP OPERATING LLC	BARNETT SOUTH GATHERING	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	563562
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
07360	FREEDOM PIPELINE, LLC	MOORE GATHERING SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24582
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24564
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24506
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24521
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	3.50	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24515
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25139
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24514
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24505
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	24731
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	ABANDONED	GAS GATHERING	24821

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	ABANDONED	GAS GATHERING	24824
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	25263
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25122
08714	EAGLERIDGE OPERATING, LLC	WEST GRANDVIEW	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
08714	EAGLERIDGE OPERATING, LLC	WEST GRANDVIEW	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
08714	EAGLERIDGE OPERATING, LLC	WEST GRANDVIEW	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
08714	EAGLERIDGE OPERATING, LLC	WEST GRANDVIEW	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
08714	EAGLERIDGE OPERATING, LLC	WEST GRANDVIEW	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
07084	ENERGY TRANSFER COMPANY	20062223 HAWK SILVER DOWN EAST	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	25156
00018	EXPLORER PIPELINE COMPANY	ALLENDALE TO ARLINGTON	REFINED LIQUID PRODUCT	10.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B2149
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B3317
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B3324
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B3325
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B1761
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	B3327
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	B3328
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	B2155
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	ABANDONED	GAS GATHERING	B2201
07730	ONEOK NGL PIPELINE, L.L.C.	ONEOK NGL	HIGHLY VOLATILE LIQUID (HVL)	16.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	NOT REPORTED
06258	BARNETT GATHERING, LLC	HARPER GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	B2205
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	24516
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	25174

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	8.63	IN SERVICE	GAS GATHERING	24510
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
07699	SAGE NATURAL RESOURCES LLC	VARDEMAN	NATURAL GAS	4.00	IN SERVICE	GAS GATHERING	76
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	3.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
05365	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	10.75	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	22178
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
03883	ENTERPRISE PRODUCTS OPERATINGLLC	SOUTH TEXAS-TX150	NATURAL GAS	36.00	IN SERVICE	GAS TRANSMISSION	6000000
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
00578	ATMOS PIPELINE - TEXAS	WL-238	NATURAL GAS	2.38	IN SERVICE	GAS TRANSMISSION	WL-238
05754	MAGELLAN PIPELINE COMPANY, L.P.	MAGELLAN PIPE LINE	REFINED LIQUID PRODUCT	12.75	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	6921
06515	WILLIAMS MLP OPERATING LLC	BARNETT SOUTH GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	563560
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
06826	1849 MIDSTREAM PARTNERS, LLC	GRANDVIEW SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24504
04956	FLINT HILLS RESOURCES, LC	TEXAS PIPELINE	REFINED LIQUID PRODUCT	14.00	IN SERVICE	PRODUCT LINES (NOT HIGHLY VOLATILE)	60002040

Oil & Gas Pipeline Report

00088	ENLINK MIDSTREAM SERVICES, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	10.75	IN SERVICE	GAS GATHERING	24718
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	10.75	ABANDONED	OTHER PRODUCT LINES (HIGHLY VOLATILE)	20506
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	14.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	22177
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	10.75	ABANDONED	OTHER PRODUCT LINES (HIGHLY VOLATILE)	20506
00963	ONEOK NGL PIPELINE, L.L.C.	WEST TEXAS LPG	HIGHLY VOLATILE LIQUID (HVL)	14.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	22177
07084	ENERGY TRANSFER COMPANY	BASHAM-BROWNLEE	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	BAIRD	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
06515	WILLIAMS MLP OPERATING LLC	BARNETT SOUTH GATHERING	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	563561
08521	DCP OPERATING COMPANY, LP	SOUTHERN HILLS SYSTEM	HIGHLY VOLATILE LIQUID (HVL)	18.00	IN SERVICE	OTHER PRODUCT LINES (HIGHLY VOLATILE)	193521
09402	EAGLERIDGE OPERATING, LLC	DOTSON	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	DOTSON	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED
09402	EAGLERIDGE OPERATING, LLC	JOHNSON COUNTY SYSTEM	NATURAL GAS	4.50	IN SERVICE	GAS GATHERING	NOT REPORTED
07084	ENERGY TRANSFER COMPANY	20062221 DAVES STONE FLY	NATURAL GAS	6.63	IN SERVICE	GAS GATHERING	NOT REPORTED

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
1	OG	1127086	0.077 mi. ESE (407 ft.)		
1	OG	1147384	0.082 mi. ESE (433 ft.)		
2	OG	1123572	0.152 mi. ESE (803 ft.)		
3	OG	1208658	0.269 mi. WNW (1420 ft.)		
4	OG	1150432	0.281 mi. S (1484 ft.)		
4	OG	1152399	0.285 mi. S (1505 ft.)		
5	OG	1195340	0.364 mi. ESE (1922 ft.)		
5	OG	1195341	0.360 mi. ESE (1901 ft.)		
6	OG	1161908	0.385 mi. SW (2033 ft.)		
6	OG	1161911	0.378 mi. SW (1996 ft.)		
6	OG	1162747	0.392 mi. SW (2070 ft.)		
6	OG	1184076	0.374 mi. SW (1975 ft.)		
7	OG	1152090	0.433 mi. NE (2286 ft.)		
8	OG	1125791	0.533 mi. E (2814 ft.)		
8	OG	1126731	0.538 mi. E (2841 ft.)		
9	OG	1157042	0.636 mi. E (3358 ft.)		
9	OG	1157043	0.640 mi. E (3379 ft.)		
9	OG	1158003	0.633 mi. E (3342 ft.)		
10	OG	1150291	0.759 mi. ESE (4008 ft.)		
10	OG	1194966	0.763 mi. ESE (4029 ft.)		
11	OG	1196011	0.760 mi. W (4013 ft.)		
12	OG	1153482	0.781 mi. ENE (4124 ft.)		

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
13	OG	1120019	0.783 mi. ESE (4134 ft)		
13	OG	1156914	0.787 mi. ESE (4155 ft)		
14	OG	1161916	0.840 mi. SW (4435 ft)		
14	OG	1161917	0.833 mi. SW (4398 ft)		
14	OG	1162746	0.826 mi. SW (4361 ft)		
15	OG	1159455	0.837 mi. W (4419 ft)		
16	OG	1195253	0.859 mi. WNW (4536 ft)		
16	OG	1195254	0.855 mi. WNW (4514 ft)		
16	OG	1195255	0.864 mi. WNW (4562 ft)		
17	OG	1102413	0.873 mi. SSE (4609 ft)		
17	OG	1161915	0.865 mi. SSE (4567 ft)		
17	OG	1162649	0.869 mi. SSE (4588 ft)		
18	OG	1189903	0.881 mi. ENE (4652 ft)		
18	OG	1189912	0.876 mi. ENE (4625 ft)		
19	OG	1163719	0.902 mi. NNE (4763 ft)		
19	OG	1180481	0.905 mi. NNE (4778 ft)		
20	OG	1195339	0.903 mi. SE (4768 ft)		
21	OG	1184809	0.928 mi. NNW (4900 ft)		
22	OG	1189907	0.931 mi. ENE (4916 ft)		

Located Sites Summary

Map ID#	Database Name	Site ID#	Distance From Site	Site Name	Address
23	OG	1113829	0.941 mi. SE (4968 ft.)		

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
1	OG	1127086	726 ft.	0.077 mi. ESE (407 ft.)		
1	OG	1147384	726 ft.	0.082 mi. ESE (433 ft.)		
2	OG	1123572	707 ft.	0.152 mi. ESE (803 ft.)		
3	OG	1208658	736 ft.	0.269 mi. WNW (1420 ft.)		
4	OG	1150432	728 ft.	0.281 mi. S (1484 ft.)		
4	OG	1152399	728 ft.	0.285 mi. S (1505 ft.)		
5	OG	1195340	712 ft.	0.364 mi. ESE (1922 ft.)		
5	OG	1195341	712 ft.	0.360 mi. ESE (1901 ft.)		
6	OG	1161908	755 ft.	0.385 mi. SW (2033 ft.)		
6	OG	1161911	755 ft.	0.378 mi. SW (1996 ft.)		
6	OG	1162747	755 ft.	0.392 mi. SW (2070 ft.)		
6	OG	1184076	755 ft.	0.374 mi. SW (1975 ft.)		
7	OG	1152090	679 ft.	0.433 mi. NE (2286 ft.)		
8	OG	1125791	695 ft.	0.533 mi. E (2814 ft.)		
8	OG	1126731	695 ft.	0.538 mi. E (2841 ft.)		
9	OG	1157042	682 ft.	0.636 mi. E (3358 ft.)		
9	OG	1157043	682 ft.	0.640 mi. E (3379 ft.)		
9	OG	1158003	682 ft.	0.633 mi. E (3342 ft.)		
10	OG	1150291	694 ft.	0.759 mi. ESE (4008 ft.)		
10	OG	1194966	694 ft.	0.763 mi. ESE (4029 ft.)		
11	OG	1196011	762 ft.	0.760 mi. W (4013 ft.)		
12	OG	1153482	679 ft.	0.781 mi. ENE (4124 ft.)		

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
13	OG	1120019	705 ft.	0.783 mi. ESE (4134 ft.)		
13	OG	1156914	705 ft.	0.787 mi. ESE (4155 ft.)		
14	OG	1161916	753 ft.	0.840 mi. SW (4435 ft.)		
14	OG	1161917	753 ft.	0.833 mi. SW (4398 ft.)		
14	OG	1162746	753 ft.	0.826 mi. SW (4361 ft.)		
15	OG	1159455	763 ft.	0.837 mi. W (4419 ft.)		
16	OG	1195253	743 ft.	0.859 mi. WNW (4536 ft.)		
16	OG	1195254	743 ft.	0.855 mi. WNW (4514 ft.)		
16	OG	1195255	743 ft.	0.864 mi. WNW (4562 ft.)		
17	OG	1102413	739 ft.	0.873 mi. SSE (4609 ft.)		
17	OG	1161915	739 ft.	0.865 mi. SSE (4567 ft.)		
17	OG	1162649	739 ft.	0.869 mi. SSE (4588 ft.)		
18	OG	1189903	695 ft.	0.881 mi. ENE (4652 ft.)		
18	OG	1189912	695 ft.	0.876 mi. ENE (4625 ft.)		
19	OG	1163719	724 ft.	0.902 mi. NNE (4763 ft.)		
19	OG	1180481	724 ft.	0.905 mi. NNE (4778 ft.)		
20	OG	1195339	727 ft.	0.903 mi. SE (4768 ft.)		
21	OG	1184809	685 ft.	0.928 mi. NNW (4900 ft.)		
22	OG	1189907	695 ft.	0.931 mi. ENE (4916 ft.)		

Site Summary By Database

Map ID#	Database Name	Site ID#	Elevation	Distance From Site	Site Name	Address
23	OG	1113829	708 ft.	0.941 mi. SE (4968 ft.)		

Oil & Gas Well Report

MAP ID	SURFACE ID	API #	WELL TYPE	WELL NUMBER	GAS-RRCID	REFER-TO-API	LATITUDE	LONGITUDE
1	1127086	25130534	DRY HOLE	30534	03412	00000000	32.352897030	-97.210075330
1	1147384	25131290	GAS WELL	31290	11219	00000000	32.356155600	-97.205765080
2	1123572	25130440	GAS WELL	30440	05650	00000000	32.358215520	-97.201925440
3	1208658	25133995	GAS WELL	33995	01770	00000000	32.362540640	-97.218677240
4	1150432	25131413	GAS WELL	31413	000000	00000000	32.343884360	-97.190209750
4	1152399	25131520	GAS WELL	31520	11248	00000000	32.341492330	-97.189636810
5	1195340	25133625	GAS WELL	33625	000000	00000000	32.348686040	-97.201945370
5	1195341	25133626	GAS WELL	33626	000000	00000000	32.350331390	-97.202999330
6	1161908	25132145	GAS WELL	32145	000000	00000000	32.335155510	-97.207628020
6	1161911	25132146	DRY HOLE	32146	000000	00000000	32.334832210	-97.205894440
6	1162747	25132191	GAS WELL	32191	000000	00000000	32.335325210	-97.209780010
6	1184076	25133230	GAS WELL	33230	20587	00000000	32.335580090	-97.204994610
7	1152090	25131502	PLUGGED GAS WELL	31502	000000	00000000	32.364680100	-97.194875360
8	1125791	25130496	GAS WELL	30496	03067	00000000	32.360023840	-97.196760240
8	1126731	25130519	GAS WELL	30519	05335	00000000	32.349707430	-97.181935760
9	1157042	25131798	GAS WELL	31798	126025	00000000	32.349078750	-97.180183680
9	1157043	25131799	GAS WELL	31799	12276	00000000	32.363132320	-97.192346880
9	1158003	25131870	GAS WELL	31870	12650	00000000	32.361898570	-97.194170650
10	1150291	25131411	GAS WELL	31411	01116	00000000	32.353469150	-97.193556360
10	1194966	25133604	GAS WELL	33604	25977	00000000	32.353064550	-97.188862870
11	1196011	25133662	GAS WELL	33662	000000	00000000	32.359149680	-97.225527200
12	1153482	25131575	GAS WELL	31575	000000	00000000	32.356746900	-97.183758480
13	1120019	25130371	GAS WELL	30371	20164	00000000	32.347442000	-97.179295830
13	1156914	25131786	GAS WELL	31786	000000	00000000	32.345529370	-97.180803280
14	1161916	25132148	PERMITTED LOCATION	32148	000000	00000000	32.331136960	-97.213101220
14	1161917	25132149	PERMITTED LOCATION	32149	000000	00000000	32.331823030	-97.211683060
14	1162746	25132190	PERMITTED LOCATION	32190	000000	00000000	32.332578100	-97.210266110
15	1159455	25131956	GAS WELL	31956	01592	00000000	32.354473430	-97.225377070
16	1195253	25133616	GAS WELL	33616	000000	00000000	32.374459580	-97.227201460
16	1195254	25133617	GAS WELL	33617	27840	00000000	32.374732960	-97.225607590
16	1195255	25133618	SHUT-IN WELL (GAS)	33618	27840	00000000	32.374032600	-97.229745860
17	1102413	25130163	GAS WELL	30163	05463	00000000	32.341090010	-97.207368040
17	1161915	25132147	GAS WELL	32147	000000	00000000	32.346598720	-97.205766310
17	1162649	25132187	GAS WELL	32187	000000	00000000	32.345237180	-97.208680330
18	1189903	25133439	GAS WELL	33439	28492	00000000	32.367159820	-97.173003530
18	1189912	25133443	GAS WELL	33443	09742	00000000	32.365859220	-97.175214560
19	1163719	25132229	GAS WELL	32229	13461	00000000	32.380695780	-97.203122140
19	1180481	25133065	GAS WELL	33065	34310	00000000	32.380763660	-97.198036840
20	1195339	25133624	GAS WELL	33624	000000	00000000	32.341678160	-97.199902340
21	1184809	25133263	GAS WELL	33263	32489	00000000	32.379890030	-97.206389140
22	1189907	25133441	GAS WELL	33441	36477	00000000	32.368981860	-97.174341800
23	1113829	25130281	GAS WELL	30281	03439	00000000	32.342417640	-97.198430780

Environmental Records Definitions - STATE (TX)

OG Oil and Gas Wells with Pipelines

VERSION DATE: 01/04/21

This oil and gas well and pipeline data set is provided by the Geographic Information System of the Railroad Commission of Texas (the Commission). The data set includes oil and gas well records dating back to the early 1960's, some wells prior to the 1960's are also included with no API and/or a historical API number in place. Please note, GeoSearch well data represents only surface locations per well; our data does not reflect bottom hole locations per well. Also, this data set includes information on natural gas, crude oil, and refined products pipelines. GIS maps may not be used for pipeline location purposes in lieu of calling an official notification center prior to excavating. It is a violation of Texas law to fail to make the required 8-1-1 calls. The Commission shall not be held liable for use of this data, which is provided as a public service for informational purposes only. Users are responsible for checking the accuracy, completeness, currency, and/or suitability of this data set themselves.

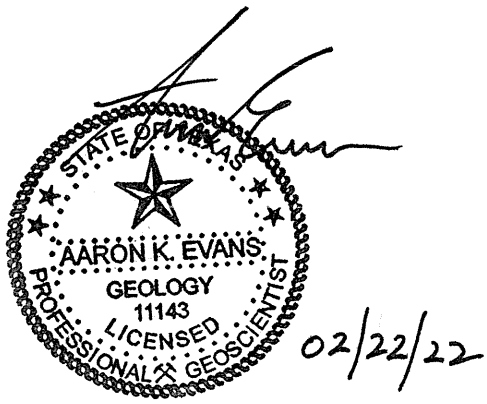
STCV Salt Caverns for Petroleum Storage

VERSION DATE: 09/01/06

The salt caverns for petroleum storage database is provided by the Railroad Commission of Texas.

APPENDIX IIIG-B

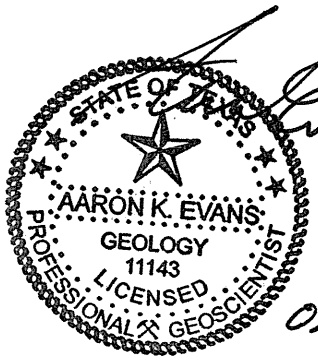
SITE EXPLORATION DATA



02/22/22

CONTENTS

FIGURE IIIG-B-1 – Boring and Well Location Map	
1981 Baker-Shiflett Boring Logs	IIIG-B-2
1984 Baker-Shiflett Boring Logs	IIIG-B-18
1986 Baker-Shiflett Boring Logs	IIIG-B-26
1987 Baker-Shiflett Boring Logs	IIIG-B-43
1988-1989 Baker-Shiflett Boring Logs	IIIG-B-52
1990 Baker-Shiflett Groundwater Monitoring Well Boring Logs	IIIG-B-72
1991 Baker-Shiflett Boring Logs	IIIG-B-75
1992-1993 EMCON Groundwater Monitoring Well Boring Logs	IIIG-B-84
1994 CURA landfill Gas Probe Boring Logs	IIIG-B-121
1994 Golder & Associates Landfill Gas Probe Boring Logs	IIIG-B-128
1995 EMCON Groundwater Monitoring Well Boring Logs	IIIG-B-151
1999 EMCON Groundwater Monitoring Well Boring Logs	IIIG-B-172
2001 Weaver Boos and Gordon Landfill Gas Probe Boring Log	IIIG-B-175
2002 The Carel Corporation Landfill Gas Probe Boring Logs	IIIG-B-178
2004 Weaver Boos Consultants Landfill Gas Probe Boring Log	IIIG-B-183
2009 The Carel Corporation Groundwater Monitoring Well Boring Logs	IIIG-B-185
2012 The Carel Corporation Boring Logs	IIIG-B-201
2013 The Carel Corporation Landfill Gas Probe Boring Log	IIIG-B-208
2021 Weaver Consultants Group Boring Logs	IIIG-B-211



02/22/22

STATE OF TEXAS
AARON K. EVANS
GEOLOGY
11143
LICENSED
PROFESSIONAL GEOSCIENTIST

02/22/22

TURKEY CREEK

WESTERN EXPANSION AREA

EASTERN EXPANSION AREA

SECTOR 1A
SECTOR 1B
SECTOR 2A
SECTOR 2B
SECTOR 3A
SECTOR 3B
SECTOR 4A
SECTOR 4B
SECTOR 4C
SECTOR 5
SECTOR 6A
SECTOR 6B
SECTOR 7A
SECTOR 7B
SECTOR 7C
SECTOR 8A
SECTOR 8B
SECTOR 8C
SECTOR 9A
SECTOR 9B
SECTOR 10A
SECTOR 10B
SECTOR 11
(UNDEVELOPED)
SECTOR 11A
SECTOR 12
SECTOR 13
SECTOR 14
SECTOR 01

MAINTENANCE BUILDING LOCATION
LANDFILL OFFICE
SCALEHOUSE
BP PIPELINE EASEMENT (GAS)
WHEEL WASH/DE-MUDDING AREA
SITE ENTRANCE

CR313
CR107
IH35

0 200 400
SCALE

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- 730 EXISTING CONTOUR
- N 6816000 STATE PLANE COORDINATE
- 32° 21' 20" GEODETIC COORDINATE
- SECTOR BOUNDARY
- PRE-SUBTITLE D AREA
- PERMITTED CLASS I WASTE AREA
- PROPOSED LATERAL EXPANSION AREA
- MW-7 (708.4) EXISTING GROUNDWATER MONITORING WELL
- GMP-12 (673.6) EXISTING GAS MONITORING PROBE
- OSWW (691.0) EXISTING ONSITE WATERWELL
- B-1 (684.2) 1981 BAKER-SHIFLETT BORING
- S-1 (700.0) 1984 BAKER-SHIFLETT BORING
- B-16 (672.0) 1986 BAKER-SHIFLETT BORING
- A-1 (720.0) 1987 BAKER-SHIFLETT BORING
- B-31 (715.2) 1988-1991 BAKER-SHIFLETT BORING
- B9-1 (683.2) 2012 CAREL CORPORATION BORING
- MW-14 (674.4) FORMER GROUNDWATER MONITORING WELL
- GMP-10 (670.8) FORMER GAS MONITORING PROBE
- WCG-8 (702.4) 2021 WCG EXPANSION BORING
- PWCG-1 (673.9) 2021 WCG EXPANSION BORING WITH PIEZOMETER INSTALLATION

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. BOREHOLE LOCATION COORDINATES AND SURFACE ELEVATIONS OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION REPORTS OR FROM AS-BUILT SURVEYS BY WCG.
3. GROUND SURFACE ELEVATIONS AT THE TIME OF DRILLING POSTED AT EACH BOREHOLE LOCATION IN FT-MSL.
4. NA = NO SURFACE ELEVATION INFORMATION AVAILABLE FOR MONITORING WELL BORINGS MW-1 THROUGH MW-5.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: IIIG-B-1_BOREHOLE LOC MAP.DWG

DRAWN BY: JDW
DESIGN BY: AKE
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
BOREHOLE LOCATION MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIG-B-1

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O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-B-1-BOREHOLE LOCATION PLAN.dwg, rarrington, 1:2

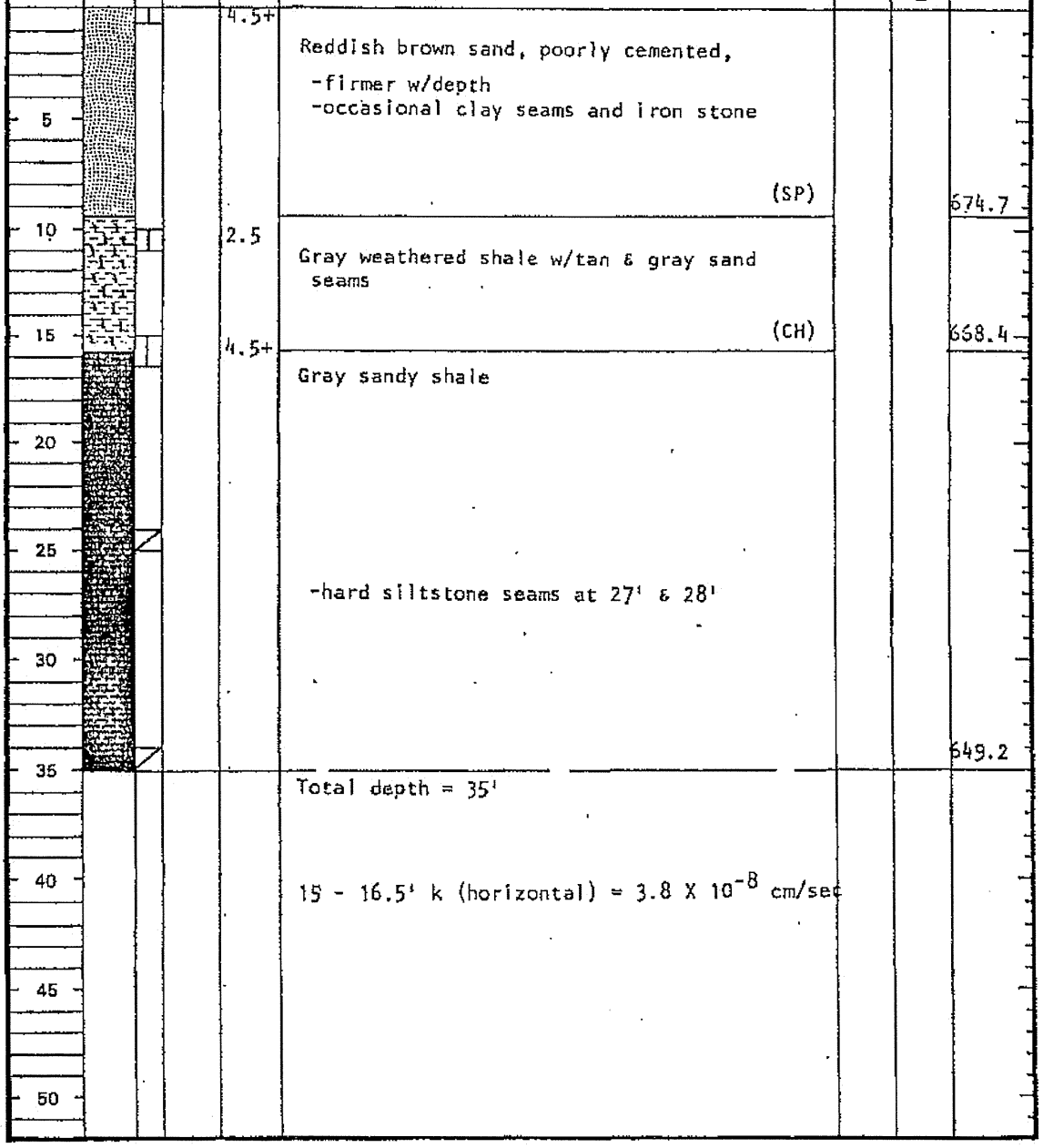
1981 BAKER-SHIFLETT BORING LOGS

LOG OF BORING NO. 1

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE: 11-19-81 PROJECT NO: 81114

TYPE: Core LOCATION: See Plan of Boring



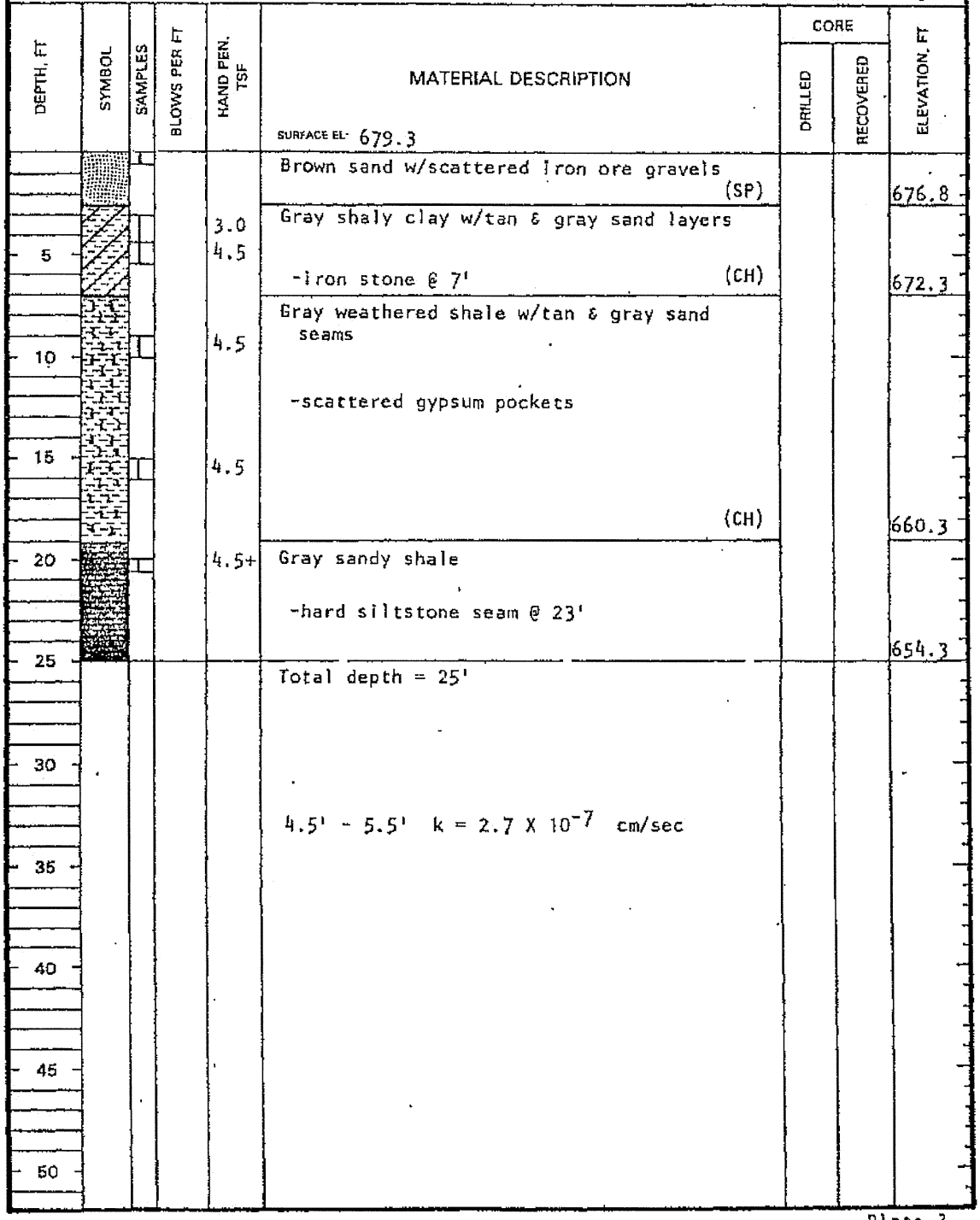
BAKER-SHIFLETT & ASSOCIATES

Plate 2

LOG OF BORING NO. 2

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE: 11-16-81
TYPE: Core
PROJECT NO. 81114
LOCATION: See Plan of Boring



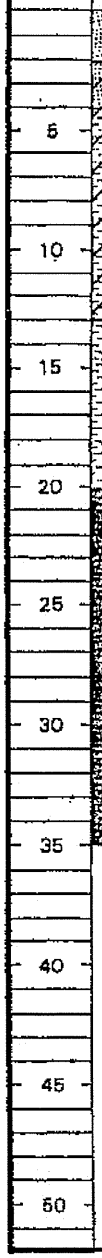
BAKER-SHIFLETT & ASSOCIATES

Plate 3

LOG OF BORING NO. 3

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-20-81 PROJECT NO 81114
TYPE Core LOCATION See Plan of Boring



DEPTH, FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
		SURFACE EL: 680.8			
	4.5	Random fill - brown sand, sandstone, gravel (moist)			678.8
		Reddish brown & gray clayey sand, moist (SC)			676.8
5	4.0	Gray shaly clay w/tan & gray sand layers			
	3.5				
	3.0				
	3.0	-scattered iron ore gravels			
10		(CH)			667.8
		Gray weathered shale w/tan & gray sand seams			
15	3.5				
		-lignite pocket (CH)			660.8
20		Gray sandy shale			
		-hard siltstone seams @ 24', 24 3/4', 31, & 32			
25			5.0	5.0	
30			5.0	4.5	
					645.8
35		Total depth = 35'			
40					
45					
50					

BAKER-SHIFLETT & ASSOCIATES

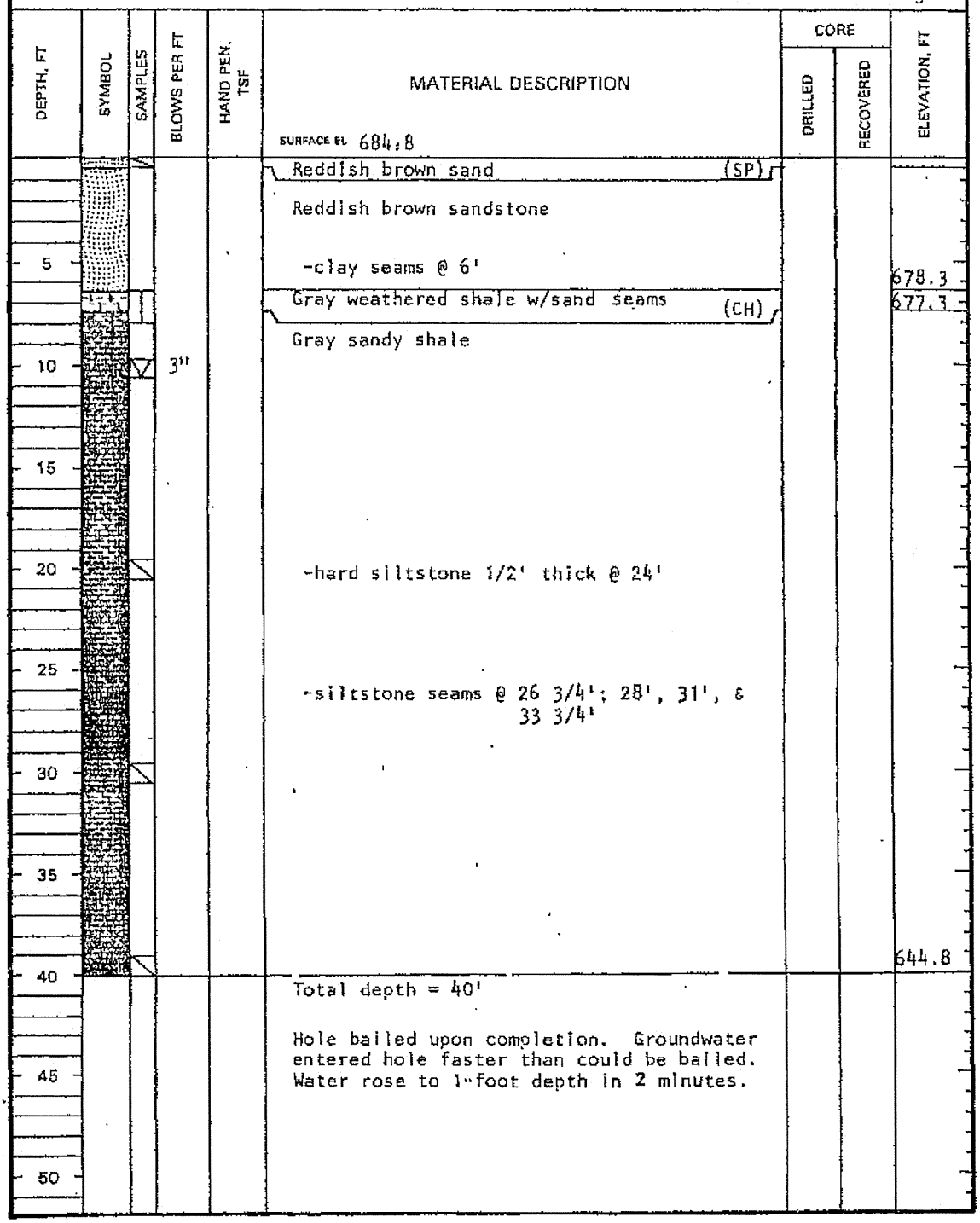
Plate 4

LOG OF BORING NO. 4

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-20-81
TYPE Core

PROJECT NO 81114
LOCATION See Plan of Boring



BAKER-SHIFLETT & ASSOCIATES

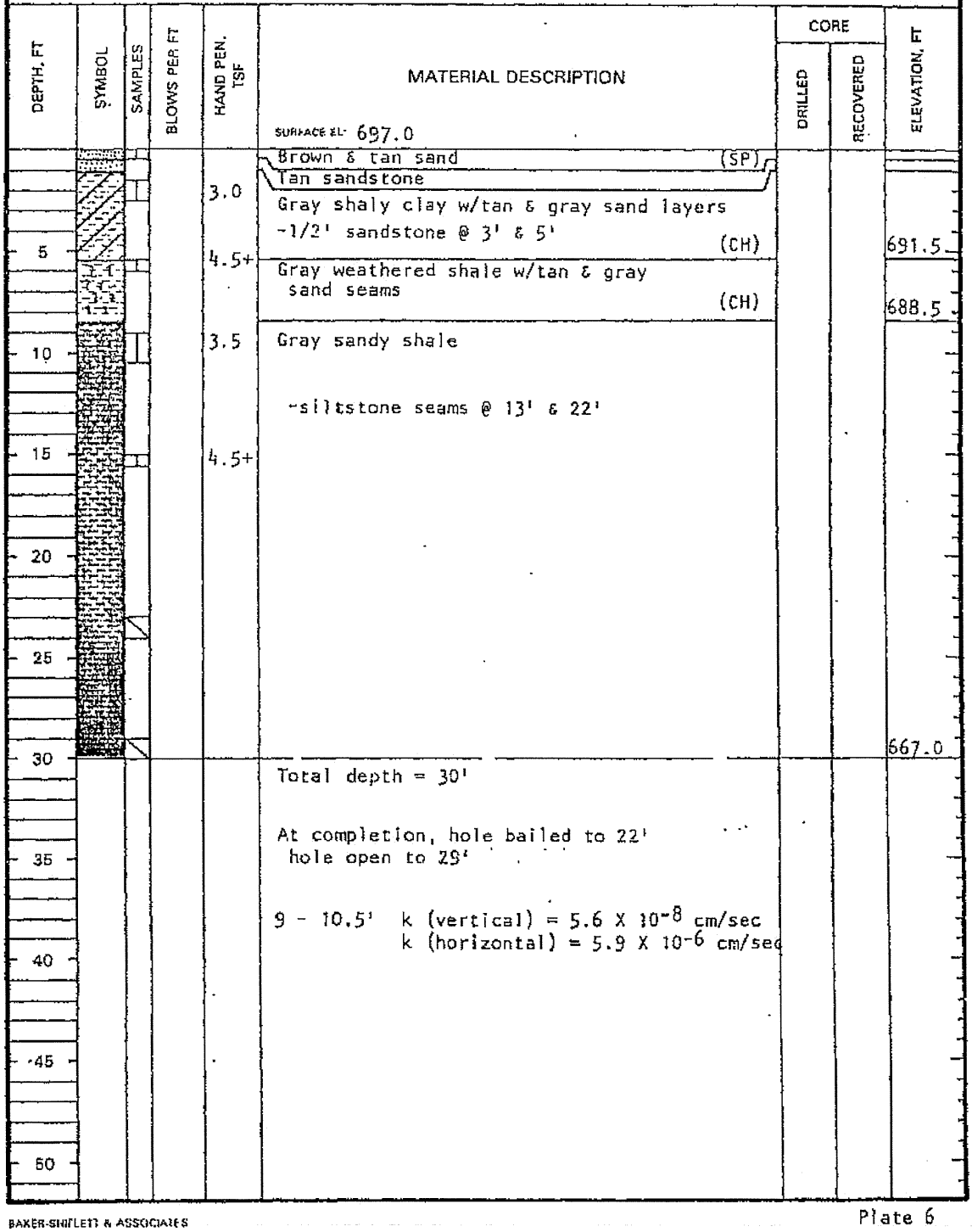
Plate 5

LOG OF BORING NO. 5

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE: 11-19 & 20-81
TYPE: Core

PROJECT NO: 81114
LOCATION: See Plan of Borings



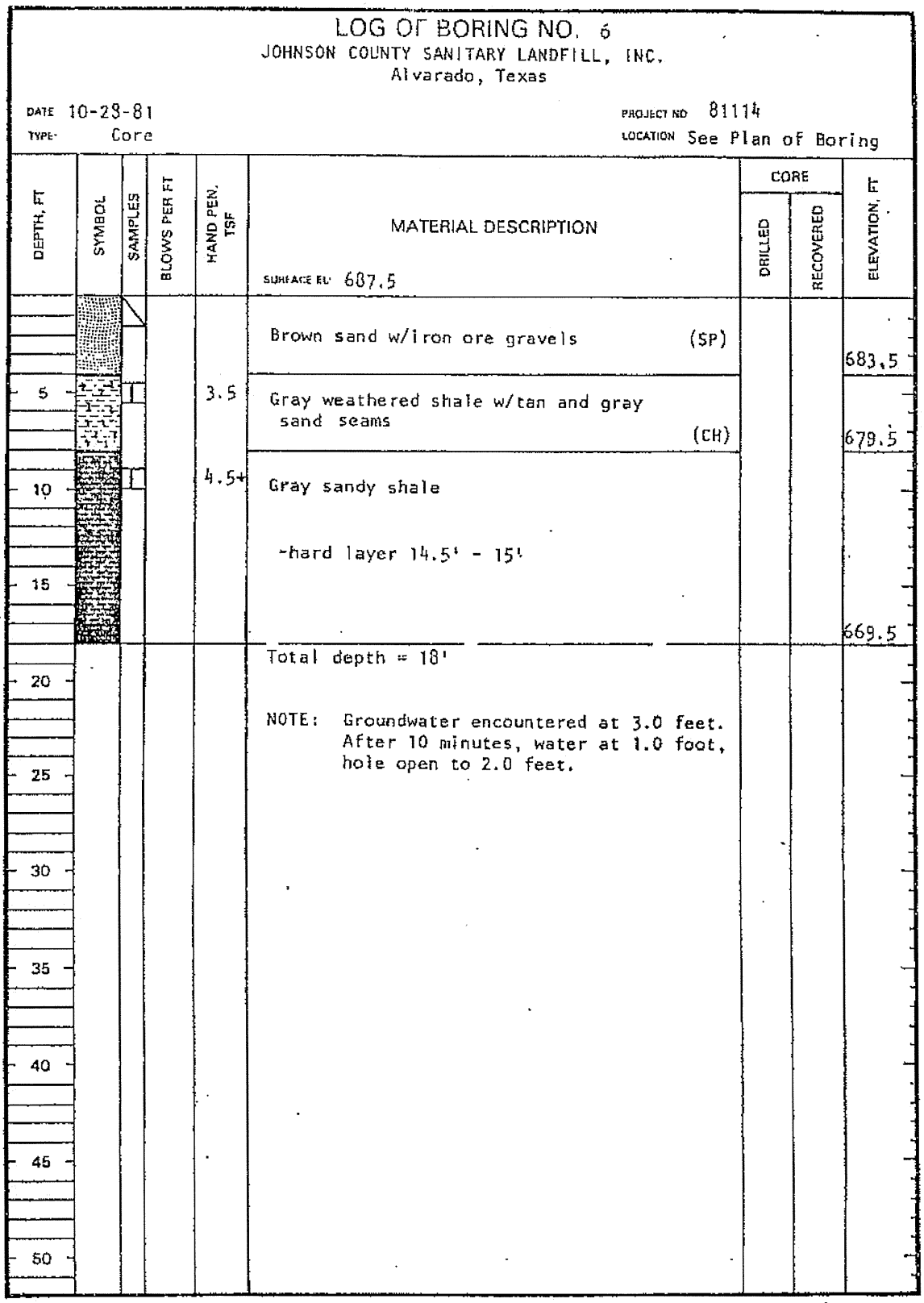
BAKER-SHIFLETT & ASSOCIATES

Plate 6

LOG OF BORING NO. 6

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 10-28-81 PROJECT NO 81114
TYPE Core LOCATION See Plan of Boring



BAKER SHIFLETT & ASSOCIATES

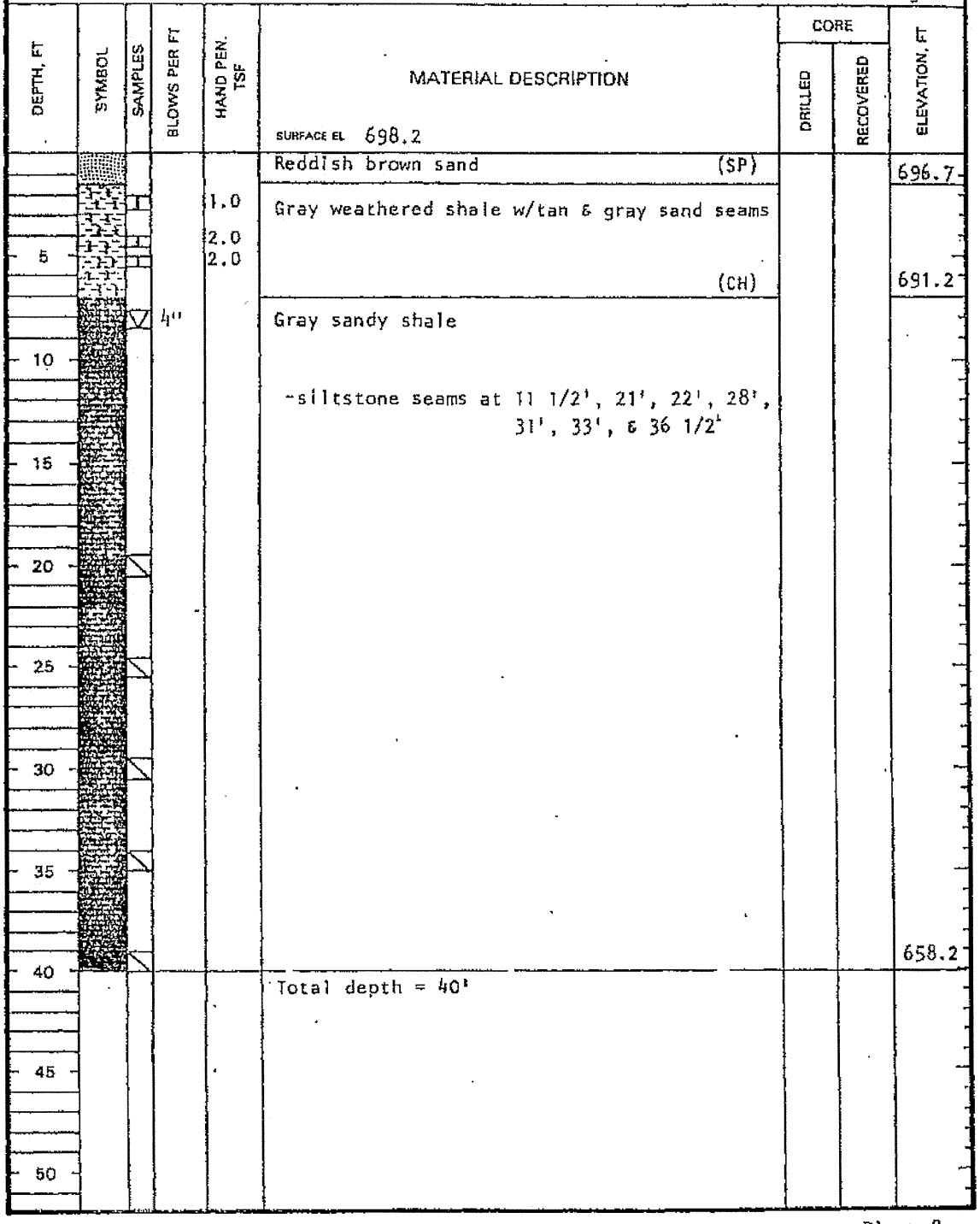
Plate 7

LOG OF BORING NO. 7

JOHNSON COUNTY SANITARY LANDFILL, INC.

DATE 11-19-81 PROJECT NO. 81114

TYPE Core LOCATION See Plan of Boring



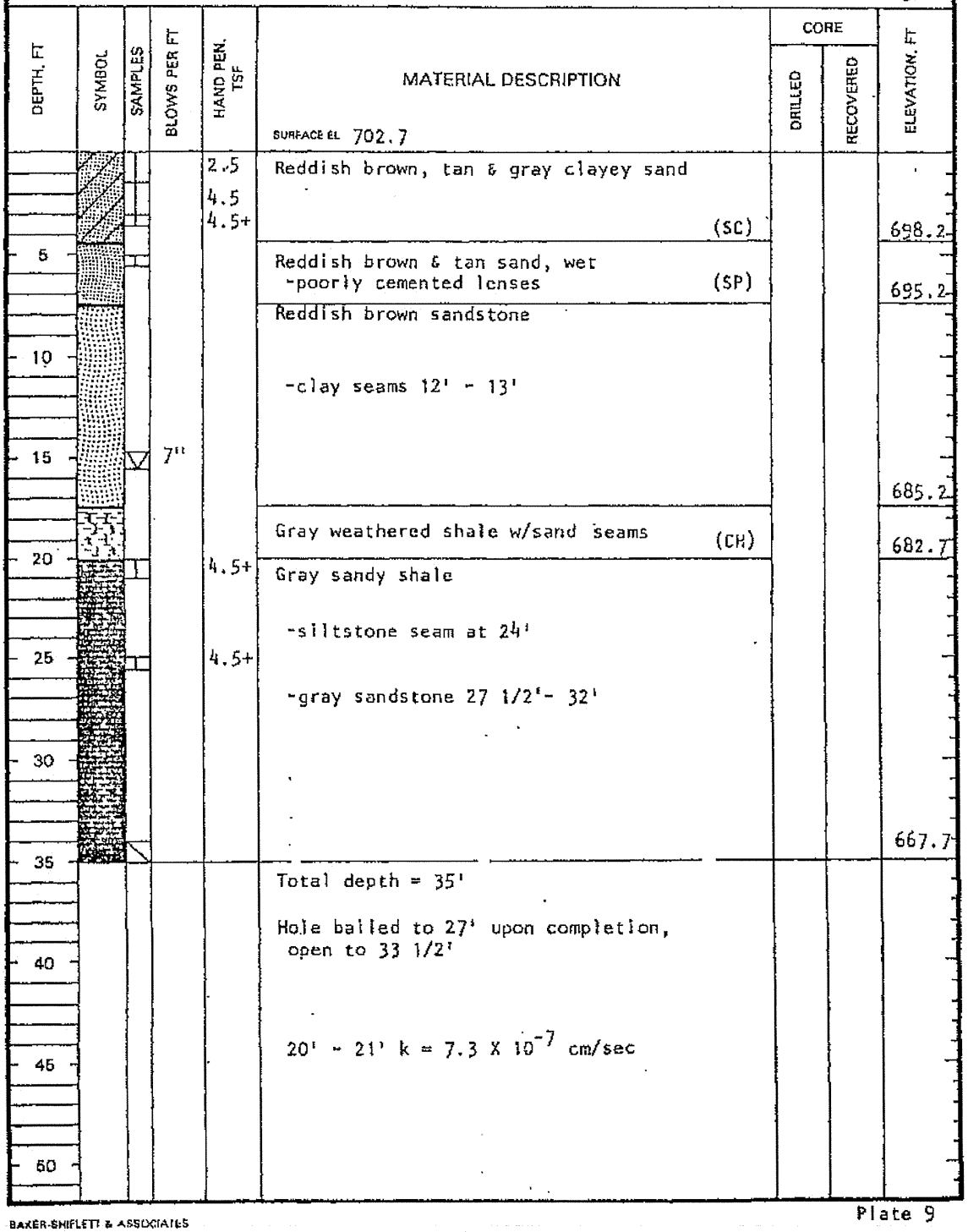
BAKER-SHIFLETT & ASSOCIATES

Plate 8

LOG OF BORING NO. 8

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-18-81 PROJECT NO 81114
TYPE Core LOCATION See Plan of Borings



BAKER-SHIFLETT & ASSOCIATES

Plate 9

LOG OF BORING NO. 9

JOHNSON COUNTY SANITARY LANDFILL, INC
Alvarado, Texas

DATE 11-17-81
TYPE Core

PROJECT NO: 81114
LOCATION: See Plan of Borings

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL. 702.5			
					Reddish brown sand			
					-iron ore & clay seams 2' - 3' (SP)			699.5
					Gray weathered shale w/tan & gray sand seams			
5				4.5+	-sandstone 4' - 5' (CH)			695.9
				4.5+	Gray sandy shale			
10				4.5+	-siltstone seams @ 8 3/4' & 18'			
15								
20								
			1"					678.5
25					Total depth = 24'			
30					Field infiltration test 8 1/2' to 24'			
					$k = 2 \times 10^{-5}$ cm/sec			
35					5' - 5.75' $k = 4.5 \times 10^{-9}$ cm/sec			
40								
45								
50								

BAKER-SHIFLETT & ASSOCIATES

Plate 10

LOG OF BORING NO. 10

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE: 11-18-81
TYPE: Core

PROJECT NO: 81114
LOCATION: See Plan of Borings

SURFACE EL 692.9

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					Tan sand, well cemented below 6" (SP)			691.4
				2.5	Gray weathered shale w/sand seams (CH)			689.9
				4.5				
5				4.5	Gray sandy shale			
10				4.5+	-shells @ 10'			
					-siltstone seams from 10' to 15'			
15				4.5+				
					-gray sandstone 18' - 19 3/4'			
20								
25					-siltstone seams @ 26', 27 3/4', 28 1/4', 31 1/4', 34', 38' & 39'			
30								
35								
								652.9
40					Total depth = 40'			
					Field infiltration test 5' to 15' $k = 2.5 \times 10^{-6}$ cm/sec			
45					4' - 5' $k = 5.3 \times 10^{-8}$ cm/sec			
50								

BAKER-SHIFLETT & ASSOCIATES

Plate 11

LOG OF BORING NO. 11

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-16 & 20-81 PROJECT NO 81114
TYPE Core LOCATION See Plan of Boring

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL. 707.4			
					Reddish brown sandstone			705.4
				4.5	Gray weathered shale w/tan & gray sand seams (CH)			701.9
5					Gray sandy shale			
10			34"		-siltstone seams @ 11', 12', 19' & 24'			
15								
20								
25								682.4
					Total depth = 25'			
30					Upon completion, hole bailed to 10.5', open to 25'			
35								
40								
45								
50								

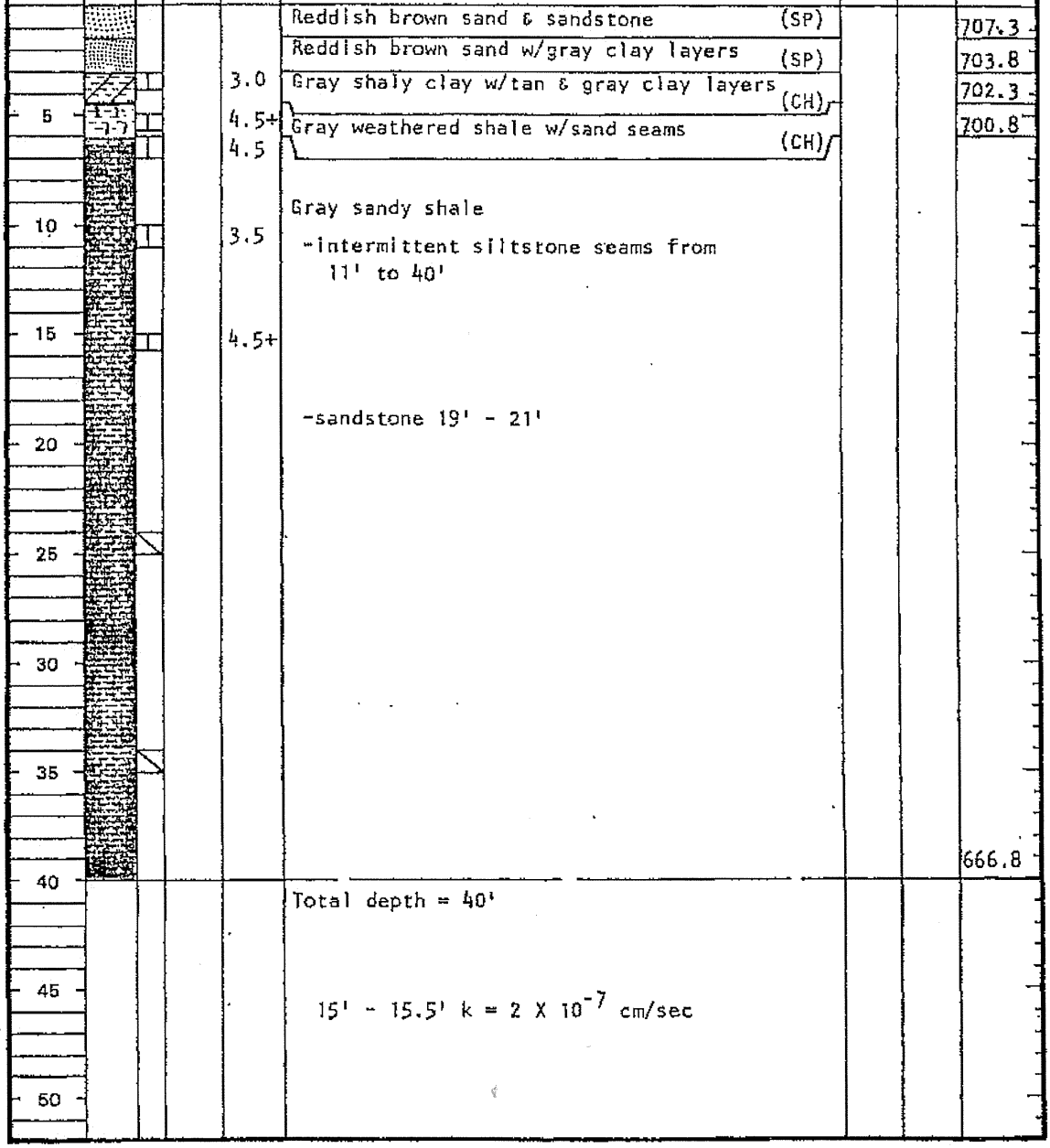
BAKER-SHIFLETT & ASSOCIATES

Plate 12

LOG OF BORING NO. 12

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-18-81
TYPE Core
PROJECT NO. 81114
LOCATION: See Plan of Borings



BAKER-SHIFLETT & ASSOCIATES

Plate 13

LOG OF BORING NO. 13

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-18-81
TYPE Core
PROJECT NO. 81114
LOCATION See Plan of Borings

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL: 714.2			
			1"		Reddish brown sand, poorly cemented (SP)			
					Reddish brown sandstone, hard			712.7
				4.5+	Reddish brown sandstone (poorly cemented)			710.7
5				4.5+	Gray shaly clay w/tan & gray sand layers			
				4.5+	(CH)			706.2
10				4.5+	Gray weathered shale w/tan & gray sand seams			
					(CH)			701.2
15				4.5+	Gray sandy shale			
20					-intermittent siltstone seams to 35'			
25					-gypsum & lignite pockets			
30								
35								679.2
					Total depth = 35'			
40					Field infiltration test 5' to 35'			
					$k = 6.4 \times 10^{-6}$ cm/sec.			
45								
50								

BAKER-SHIFLETT & ASSOCIATES

Plate 14

LOG OF BORING NO. 14

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-20-81
TYPE Core

PROJECT NO 81114
LOCATION: See Plan of Boring

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL 669.1			
				1.5 2.0	Gray sandy shaly clay w/gypsum pockets and sand seams			
				3.5	-shalier w/depth			
5				3.5	(CH)			663.1
				3.0	Tan & gray weathered shale			
				3.5	-gypsum pockets			
10				4.5	(CH)			659.1
				4.5+	Gray sandy shale, water stains			657.6
					Total depth = 11.5'			
15					Dry at completion			
20								
25								
30								
35								
40								
45								
50								

BAKER-SHIFLETT & ASSOCIATES

Plate 15

LOG OF BORING NO. 15

JOHNSON COUNTY SANITARY LANDFILL, INC.
Alvarado, Texas

DATE 11-20-81 PROJECT NO 81114

TYPE Core LOCATION See Plan of Borings

DEPTH, FT	SYMBOL	SAMPLES	BLOWS PER FT	HAND PEN. TSF	MATERIAL DESCRIPTION (SURFACE EL 678.0)	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
				4.5	Reddish brown & gray sandy clay w/ironstone			
				4.5+	& sandstone seams			
				4.5+	(CL)			673.5
5				4.5+	Tan & gray poorly cemented sandstone			
				4.5+	Gray shaly clay w/sand seams (CH)			670.5
					Total depth = 7.5'			
10					Dry at completion			
15								
20								
25								
30								
35								
40								
45								
50								

BAKER-SHIFLETT & ASSOCIATES

Plate 16

1984 BAKER-SHIFLETT BORING LOGS

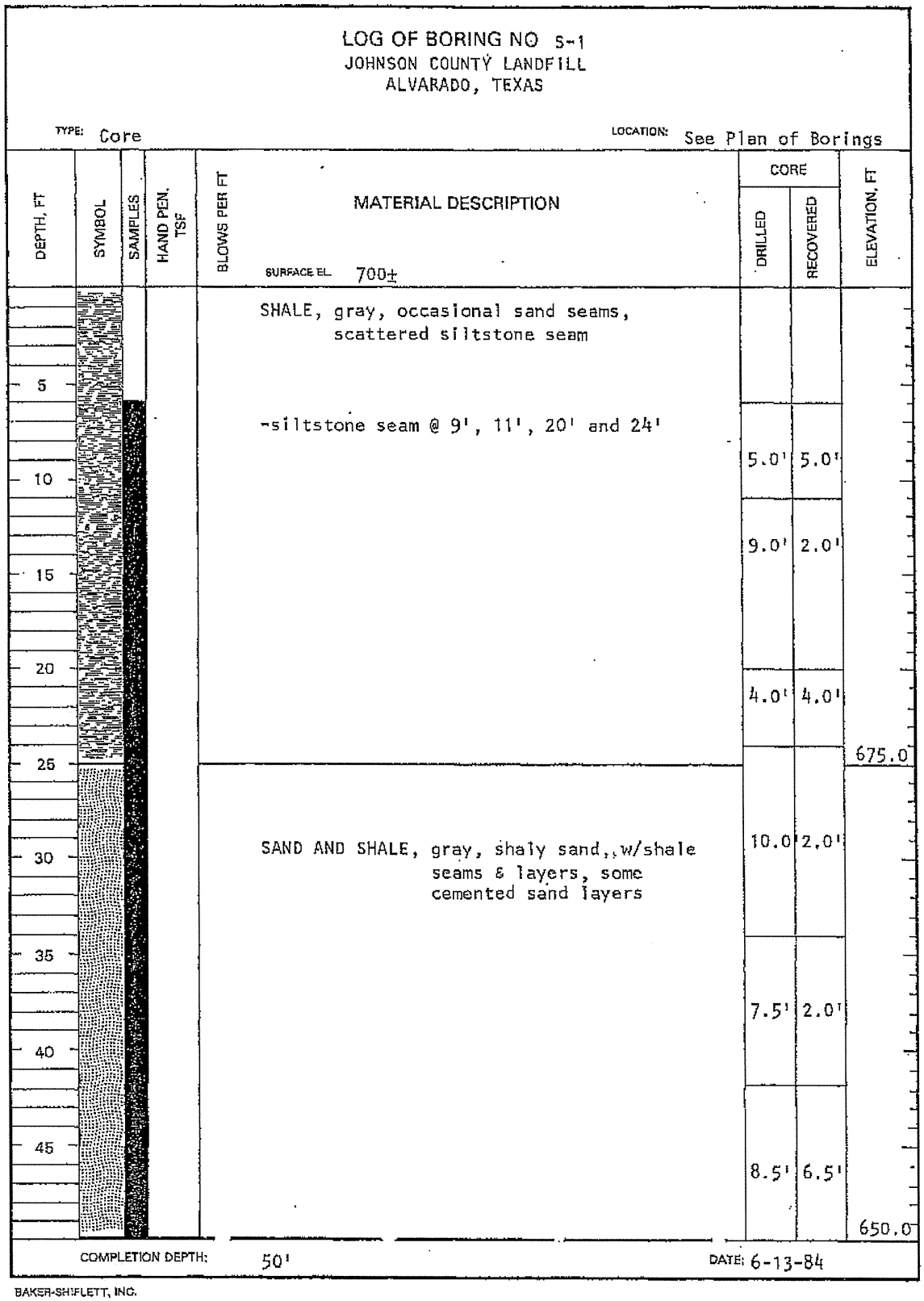

LOG OF BORING NO S-1
JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS
TYPE: Core
LOCATION: See Plan of Borings
DEPTH, FT
SYMBOL
SAMPLES
HAND PEN. TSF
BLOWS PER FT
MATERIAL DESCRIPTION
SURFACE EL. 700±
CORE
DRILLED
RECOVERED
ELEVATION, FT
SHALE, gray, occasional sand seams, scattered siltstone seam
-siltstone seam @ 9', 11', 20' and 24'
5.0' 5.0'
9.0' 2.0'
4.0' 4.0'
675.0
SAND AND SHALE, gray, shaly sand, w/shale seams & layers, some cemented sand layers
10.0' 2.0'
7.5' 2.0'
8.5' 6.5'
650.0
COMPLETION DEPTH: 50'
DATE: 6-13-84
BAKER-SHIFLETT, INC.

Plate 2

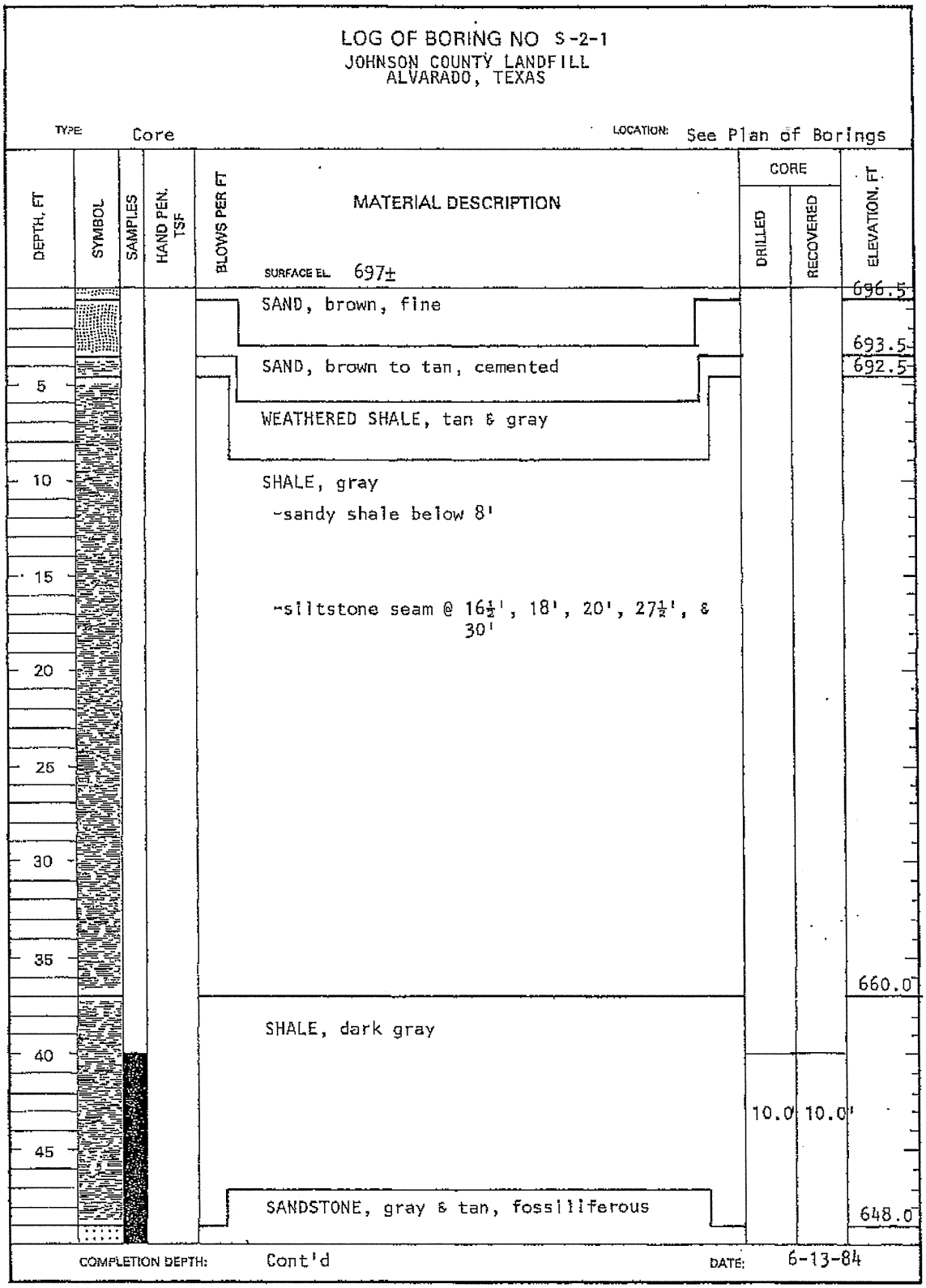

LOG OF BORING NO S-2-1
JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS
TYPE: Core
LOCATION: See Plan of Borings
DEPTH, FT
SYMBOL
SAMPLES
HAND PEN. TSF
BLOWS PER FT
MATERIAL DESCRIPTION
SURFACE EL. 697±
CORE
DRILLED
RECOVERED
ELEVATION, FT
SAND, brown, fine
696.5
693.5
SAND, brown to tan, cemented
692.5
WEATHERED SHALE, tan & gray
SHALE, gray
-sandy shale below 8'
-siltstone seam @ 16½', 18', 20', 27½', & 30'
660.0
SHALE, dark gray
10.0
10.0'
SANDSTONE, gray & tan, fossiliferous
648.0
COMPLETION DEPTH: Cont'd
DATE: 6-13-84
BAKER-SHIFLETT, INC.

Plate 3

LOG OF BORING NO S-2-2

JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS

TYPE: Core

LOCATION: See Plan of Borings

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL. 697±			
					SHALE, gray, sandy w/siltstone seams	10'0	10.0'	642.0
55					SAND AND SHALE, gray, shaly sand w/shale seams & layers, siltstone seams			
60					-cemented sand seam @ 64', 64½', & 69'	10.0'	10.0'	
65								
70								627.0
75								
80								
85								
90								
95								

COMPLETION DEPTH: 70'

DATE: 6-13-84

BAKER-SHIFLETT, INC.

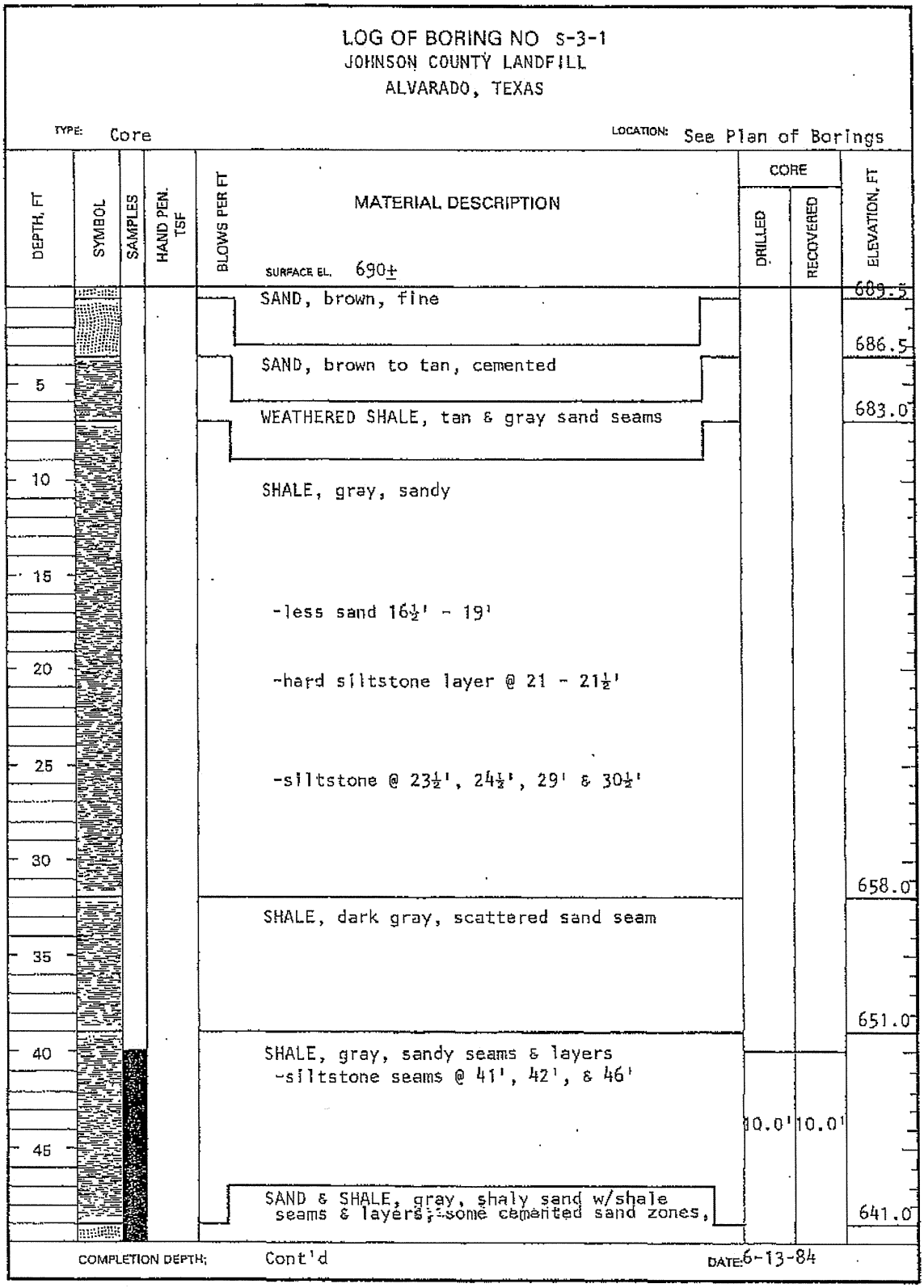
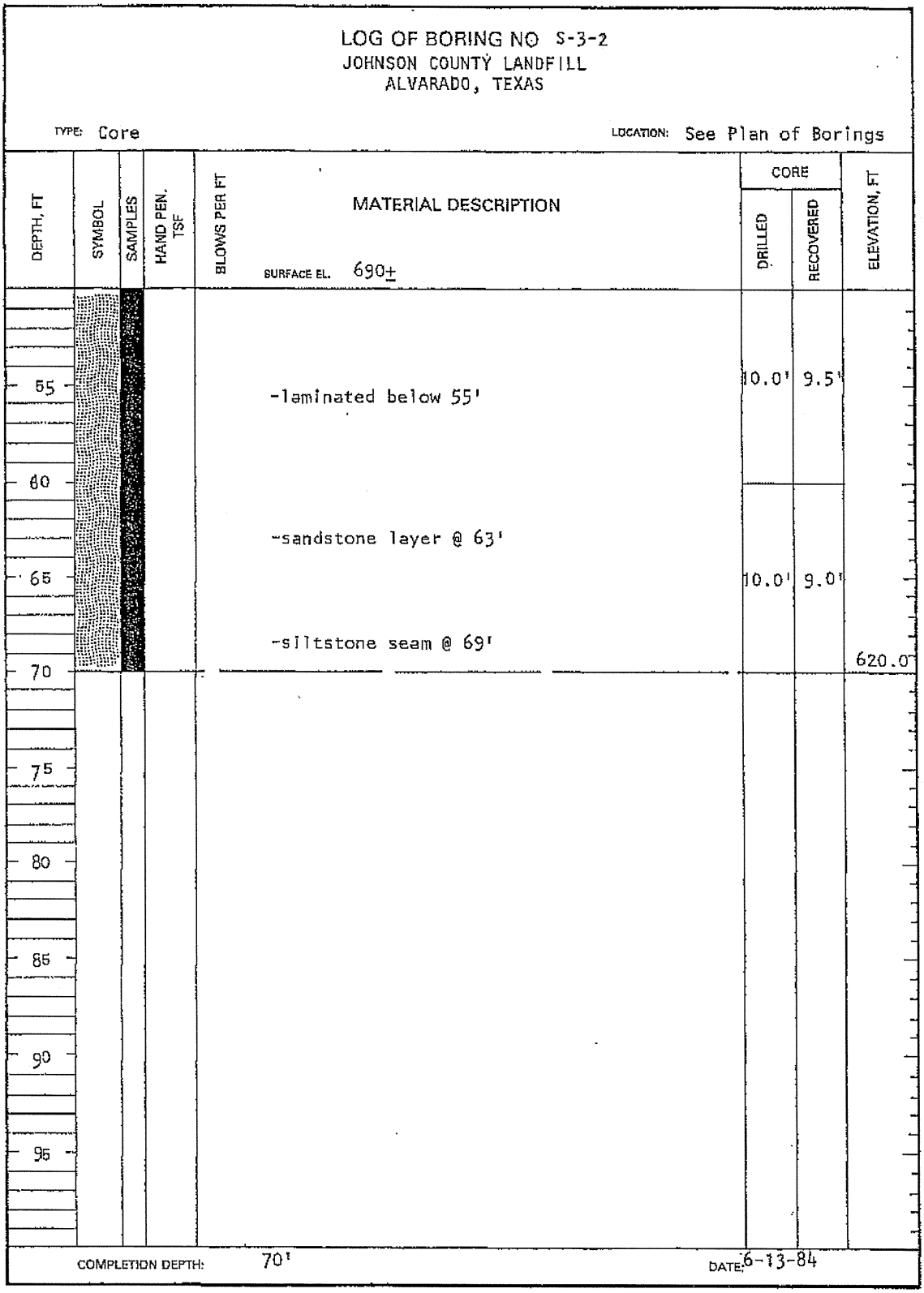

LOG OF BORING NO S-3-1
JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS
TYPE: Core
LOCATION: See Plan of Borings
DEPTH, FT
SYMBOL
SAMPLES
HAND PEN. TSF
BLOWS PER FT
MATERIAL DESCRIPTION
SURFACE EL. 690±
CORE
DRILLED
RECOVERED
ELEVATION, FT
SAND, brown, fine
689.5
SAND, brown to tan, cemented
686.5
WEATHERED SHALE, tan & gray sand seams
683.0
SHALE, gray, sandy
-less sand 16½' - 19'
-hard siltstone layer @ 21 - 21½'
-siltstone @ 23½', 24½', 29' & 30½'
658.0
SHALE, dark gray, scattered sand seam
651.0
SHALE, gray, sandy seams & layers
-siltstone seams @ 41', 42', & 46'
10.0'
10.0'
SAND & SHALE, gray, shaly sand w/shale seams & layers; some cemented sand zones,
641.0
COMPLETION DEPTH: Cont'd
DATE: 6-13-84
BAKER-SHIFLETT, INC.

Plate 5



BAKER-SHIFLETT, INC.

Plate 6

LOG OF BORING NO S-4-1
JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS

TYPE: Core

LOCATION: See Plan of Borings

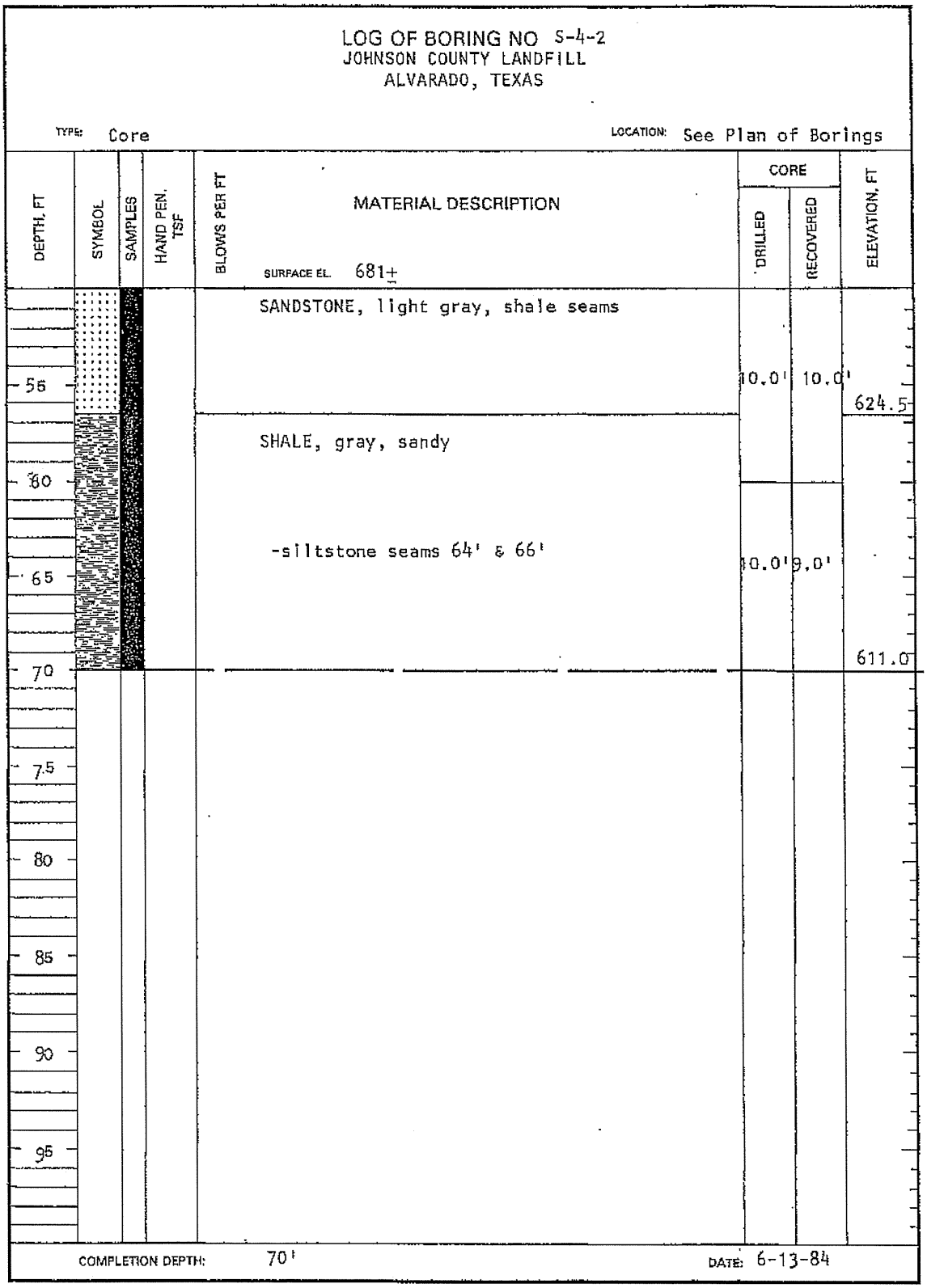
DEPTH, FT	SYMBOL	SAMPLES	HAND PEN, TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL. 681±			
					SAND, brown, fine			677.5
5					WEATHERED SHALE, tan & gray, sandy			674.0
10					SHALE, gray, sandy			
15					-siltstone seam @ 17' & 25'			
20								
25					-lighter gray color 26½' to 38'			
30								
35					-siltstone @ 34'			
40					-soft sandstone layers @ 42', 42½', 43½', 45', 46', 48', 49½', 51½' & 56'			
45					-lighter gray 45' - 50'	10.0'	10.0'	631.0

COMPLETION DEPTH: Cont'd

DATE: 6-13-84

BAKER-SHIFLETT, INC.

Plate 7



BAKER-SHIFLETT, INC.

Plate 8

1986 BAKER-SHIFLETT BORING LOGS

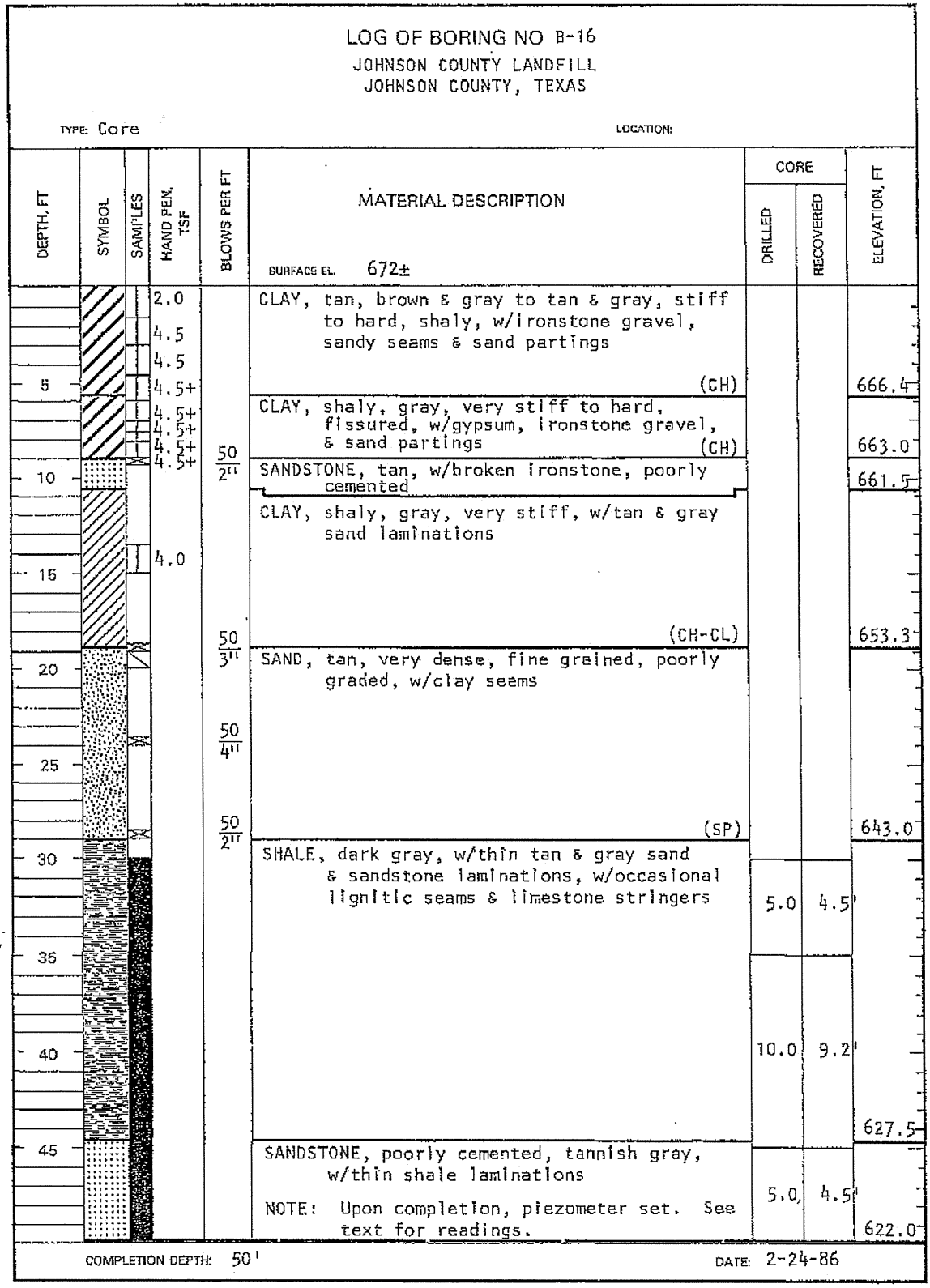

LOG OF BORING NO B-16
JOHNSON COUNTY LANDFILL
JOHNSON COUNTY, TEXAS
TYPE: Core
LOCATION:
DEPTH, FT
SYMBOL
SAMPLES
HAND PEN. TSF
BLOWS PER FT
MATERIAL DESCRIPTION
SURFACE EL. 672±
CORE
DRILLED
RECOVERED
ELEVATION, FT
2.0
4.5
4.5
4.5+
4.5+
4.5+
4.5+
4.5+
CLAY, tan, brown & gray to tan & gray, stiff to hard, shaly, w/ironstone gravel, sandy seams & sand partings (CH)
666.4
CLAY, shaly, gray, very stiff to hard, fissured, w/gypsum, ironstone gravel, & sand partings (CH)
663.0
50/2"
SANDSTONE, tan, w/broken ironstone, poorly cemented
661.5
CLAY, shaly, gray, very stiff, w/tan & gray sand laminations
4.0
(CH-CL)
653.3
50/3"
SAND, tan, very dense, fine grained, poorly graded, w/clay seams
50/4"
50/2"
(SP)
643.0
SHALE, dark gray, w/thin tan & gray sand & sandstone laminations, w/occasional lignitic seams & limestone stringers
5.0
4.5
10.0
9.2
627.5
SANDSTONE, poorly cemented, tannish gray, w/thin shale laminations
NOTE: Upon completion, piezometer set. See text for readings.
5.0
4.5
622.0
COMPLETION DEPTH: 50'
DATE: 2-24-86
BAKER-SHIFLETT, INC.

Plate 9

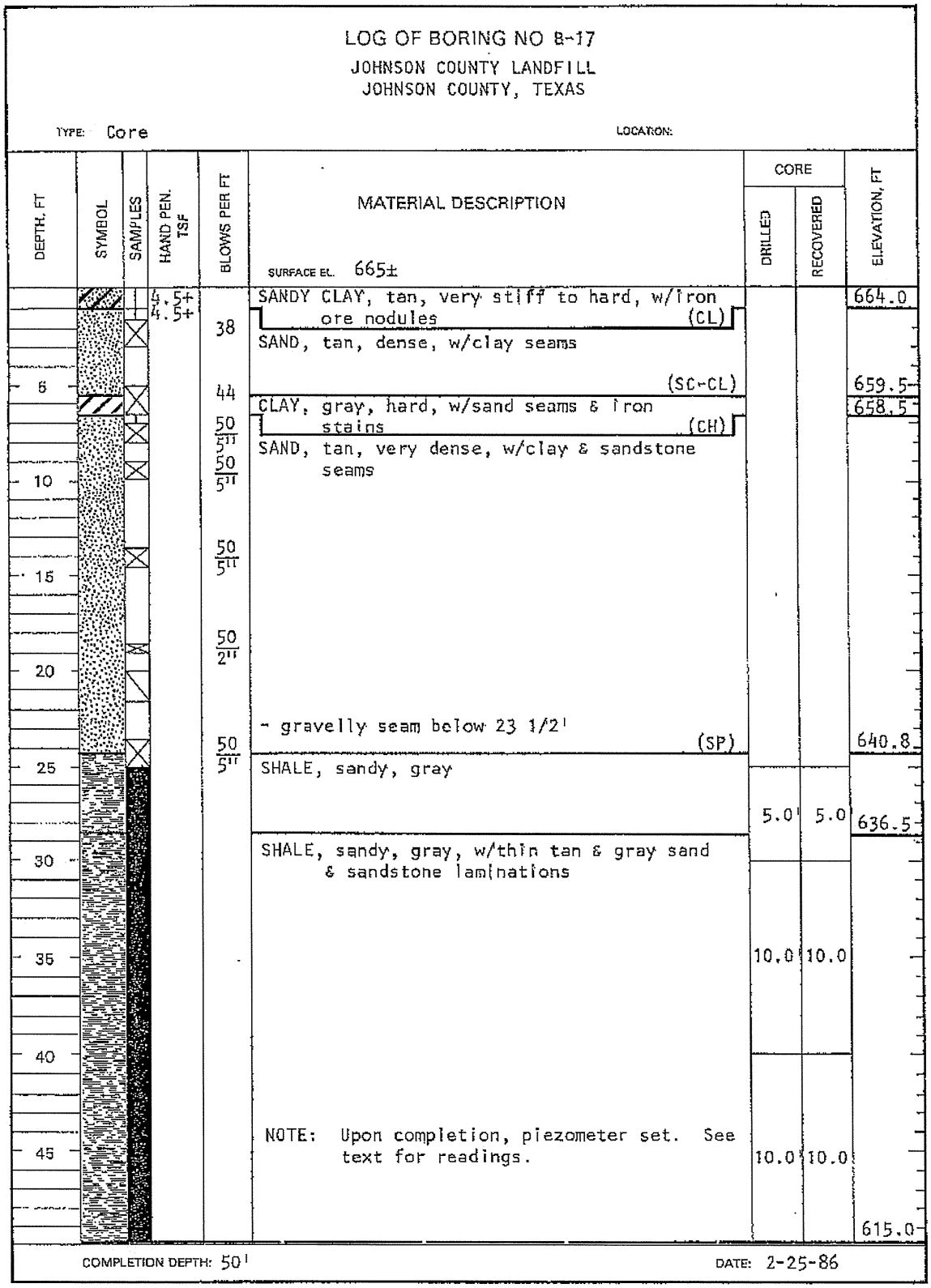
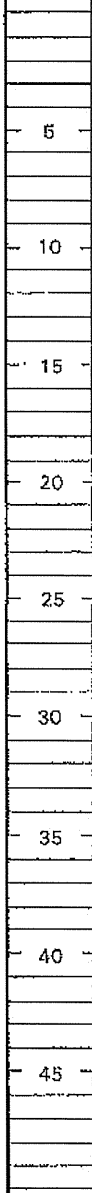

LOG OF BORING NO B-17
JOHNSON COUNTY LANDFILL
JOHNSON COUNTY, TEXAS
TYPE: Core
LOCATION:
DEPTH, FT
SYMBOL
SAMPLES
HAND PEN. TSF
BLOWS PER FT
MATERIAL DESCRIPTION
SURFACE EL. 665±
CORE
DRILLED
RECOVERED
ELEVATION, FT
4.5+
4.5+
38
SANDY CLAY, tan, very stiff to hard, w/iron ore nodules (CL)
664.0
SAND, tan, dense, w/clay seams (SC-CL)
44
659.5
CLAY, gray, hard, w/sand seams & iron stains (CH)
658.5
50/5"
50/5"
SAND, tan, very dense, w/clay & sandstone seams
50/5"
50/2"
- gravelly seam below 23 1/2' (SP)
640.8
50/5"
SHALE, sandy, gray
5.0'
5.0
636.5
SHALE, sandy, gray, w/thin tan & gray sand & sandstone laminations
10.0'
10.0
10.0'
10.0
NOTE: Upon completion, piezometer set. See text for readings.
615.0
COMPLETION DEPTH: 50'
DATE: 2-25-86
BAKER-SHIFLETT, INC.

Plate 10

LOG OF BORING NO B-18 Page 1 of 2

JOHNSON COUNTY LANDFILL
JOHNSON COUNTY, TEXAS

TYPE: Core LOCATION:



DEPTH, FT	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
				SURFACE EL. 666±			
		3.0		SANDY CLAY, tan to reddish tan, tan, & gray, stiff to hard, w/iron ore nodules (CL)			
		4.0					
		4.5+					661.5
5		4.5+		CLAYEY SAND, tan, medium dense to very dense, w/gray clay seams & iron ore nodules (SC)			
		4.5+	35				657.0
10		4.5		SANDY CLAY, reddish tan & tan, very stiff to hard, w/iron ore nodules (CL)			653.5
				CLAYEY SAND, tannish brown, medium dense, w/clay seams & scattered gravel, wet (SC)			
15			11				647.3
			25	CLAY, w/sand, tan & gray, stiff, w/iron ore nodules (CL)			646.0
20		4.5		SHALE AND SAND, gray, interbedded laminations			
		4.0					642.0
25				SHALE, gray, w/thin tan sand & sandstone laminations	5.0	4.0	638.5
				SANDSTONE, tan, w/thin gray shale laminations			
30							632.0
35				SHALE, sandy, gray, w/thin tan & gray sand & sandstone laminations	10.0	10.0	
40							
45					10.0	9.5	

- continued on next page -

BAKER-SHIFLETT, INC.

Plate 11

LOG OF BORING NO B-18 Page 2 of 2

JOHNSON COUNTY LANDFILL
JOHNSON COUNTY, TEXAS

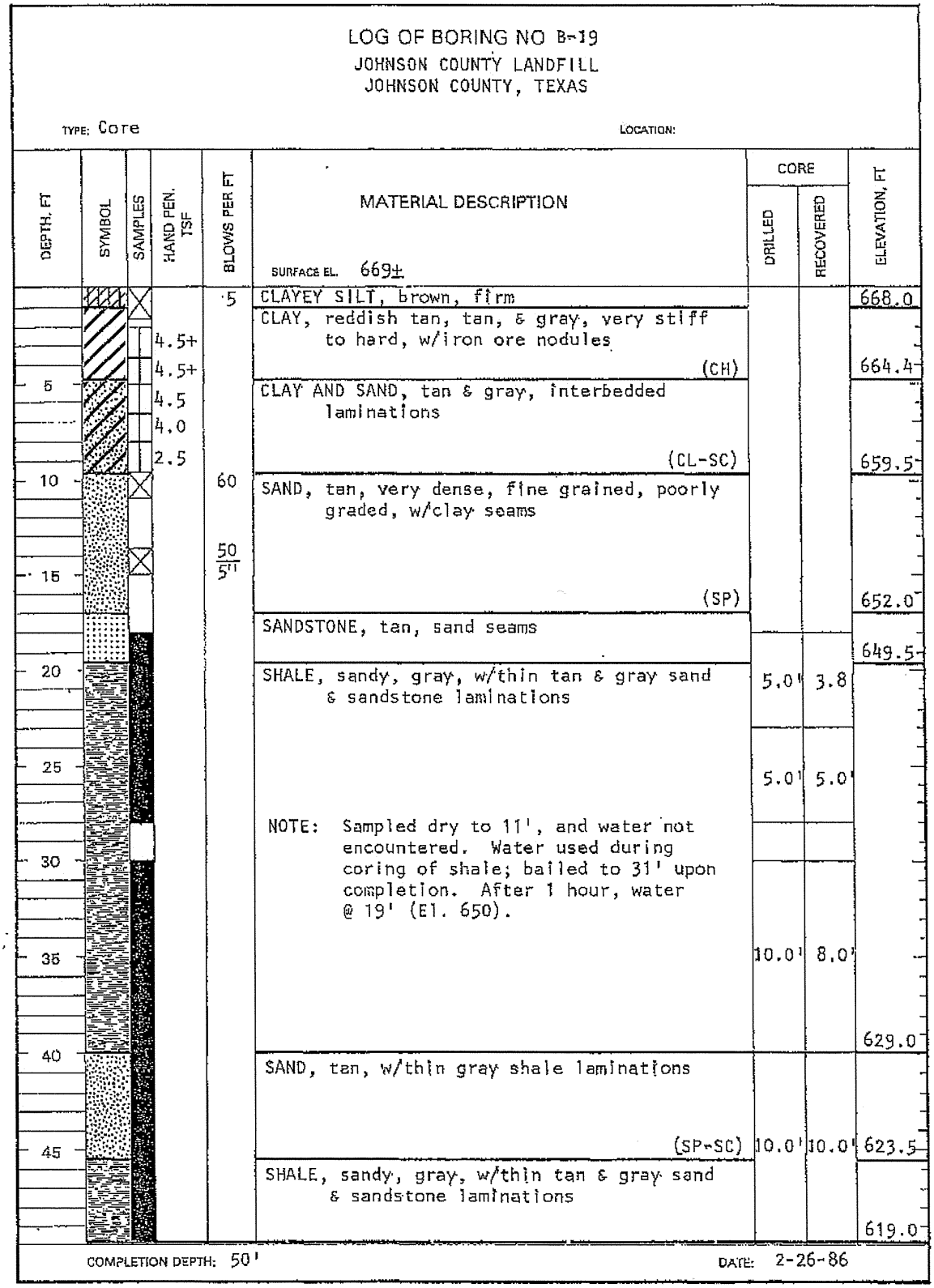
TYPE: Core LOCATION:

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					SURFACE EL.			
					SHALE, sandy, gray, w/thin tan & gray sand & sandstone laminations			614.0
55					SANDSTONE, gray, w/thin gray shale laminations	10.0	9.0	608.0
60					SAND, gray, medium grained, poorly graded (SP)			606.0
65					NOTE: Water encountered @ 16 1/2' (El. 650) during the drilling process.			
70								
75								
80								
85								
90								
95								

COMPLETION DEPTH: 60' DATE: 2-25-86

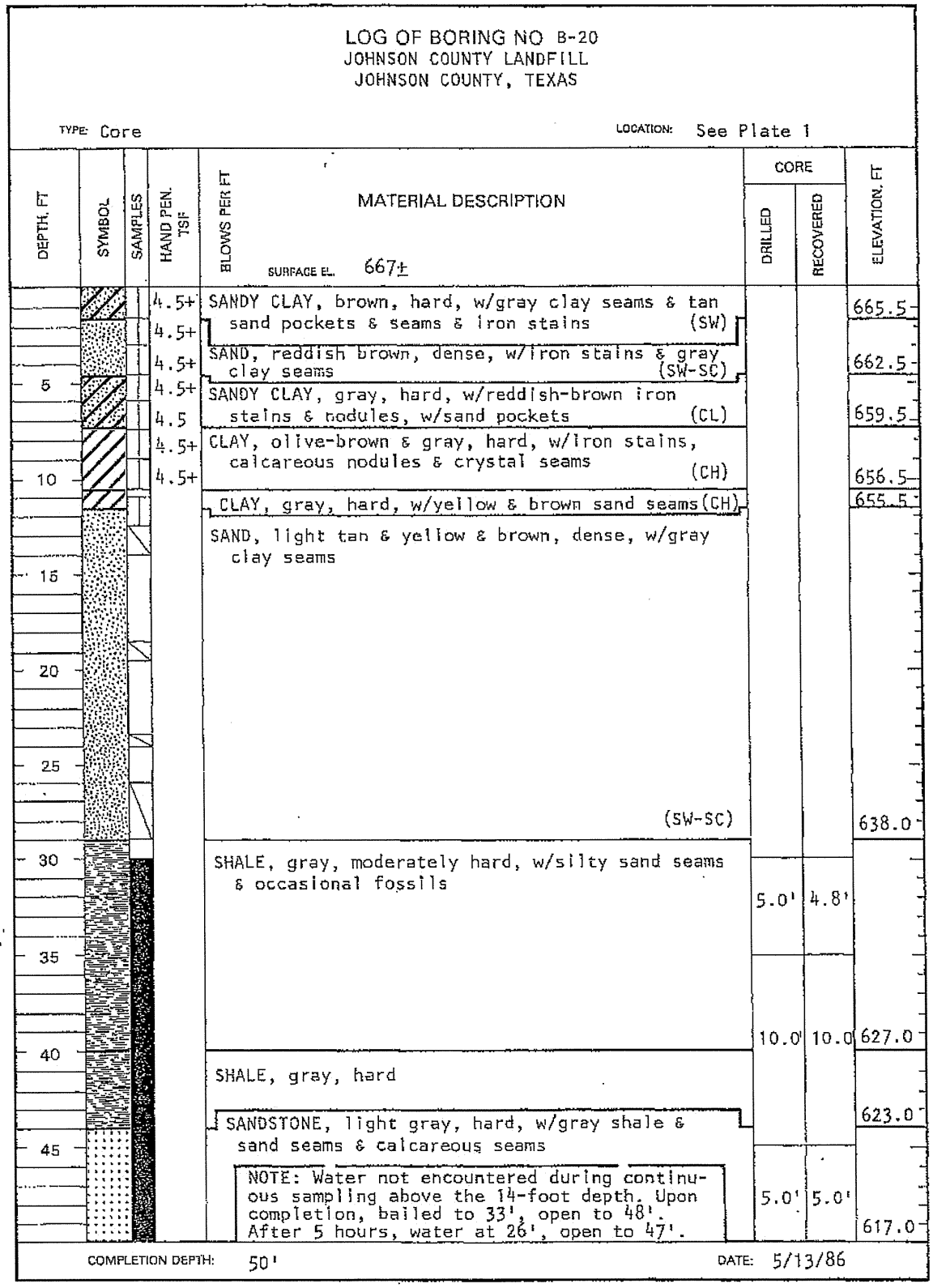
BAKER-SHIFLETT, INC.

Plate 12



BAKER-SHIFLETT, INC.

Plate 13



BAKER-SHIFLETT, INC.

Plate 14

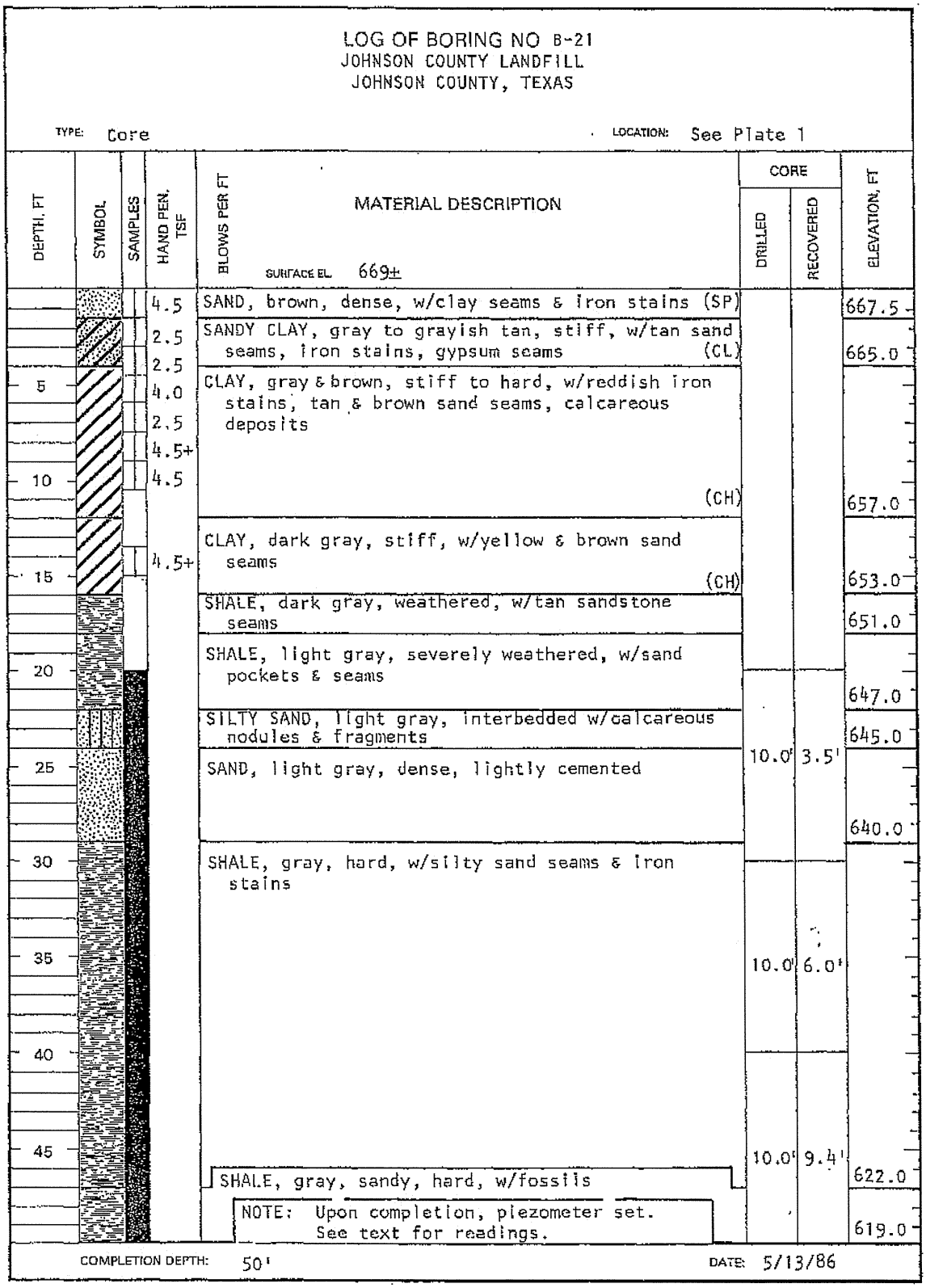
LOG OF BORING NO B-21
JOHNSON COUNTY LANDFILL
JOHNSON COUNTY, TEXAS

TYPE: Core LOCATION: See Plate 1

SURFACE EL. 669±

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
			4.5		SAND, brown, dense, w/clay seams & iron stains (SP)			667.5
			2.5		SANDY CLAY, gray to grayish tan, stiff, w/tan sand seams, iron stains, gypsum seams (CL)			665.0
5			2.5 4.0 2.5 4.5+		CLAY, gray & brown, stiff to hard, w/reddish iron stains, tan & brown sand seams, calcareous deposits (CH)			
10			4.5					657.0
15			4.5+		CLAY, dark gray, stiff, w/yellow & brown sand seams (CH)			653.0
					SHALE, dark gray, weathered, w/tan sandstone seams			651.0
20					SHALE, light gray, severely weathered, w/sand pockets & seams			647.0
					SILTY SAND, light gray, interbedded w/calcareous nodules & fragments			645.0
25					SAND, light gray, dense, lightly cemented	10.0'	3.5'	640.0
30					SHALE, gray, hard, w/silty sand seams & iron stains			
35						10.0'	6.0'	
40								
45						10.0'	9.4'	
					SHALE, gray, sandy, hard, w/fossils			622.0
					NOTE: Upon completion, piezometer set. See text for readings.			619.0

COMPLETION DEPTH: 50' DATE: 5/13/86



BAKER-SHIFLETT, INC.

Plate 15

LOG OF BORING NO. B-22
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 704± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
		1.5			SANDY CLAY, reddish brown, stiff, w/iron stains & nodules (CL; 3'; El 701)
5		4.5 4.5 4.5 4.5			CLAYEY SAND, reddish tan, hard, w/iron stains & nodules (SC; 9'; El 695)
10					SAND, tan & reddish brown, dense, w/iron stains & sandstone seams, slightly clayey
15			72		
20			78		(SC; 23.5'; El 680.5)
25			75		SHALE, sandy, gray, w/occasional siltstone seams
			100		(CL; 28.5'; El 675.5)
30			100		SHALE, w/sand, gray, w/sand seams
35					(CL; 35.5'; El 668.5)
40					
45					
50					

Completion Depth: 35.5'
Date: 12-10-86

BAKER-SHIFLETT, INC.

Plate 11a-B.1

LOG OF BORING NO. B-23
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 708± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
0					SAND, dark reddish brown, medium dense, w/iron stains & nodules, slightly silty
5					
10					
15			74		CLAY SHALE, dark gray, w/sand seams, layer of tan clay @ top of shale
20					
25			100		
30					(SP; 16'; El 692) (CL; 30'; El 678)
35					
40					
45					
50					

Completion Depth: 30'
Date: 12-10-86

BAKER-SHIFLETT, INC.

Plate 11a-B.2

LOG OF BORING NO. B-24
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 710± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, % / R.Q.D. %	MATERIAL DESCRIPTION
		2.5		SAND, silty, dark brown, loose (SP; 0.5'; El 709.5)
		1.5		SANDY CLAY, reddish brown, firm, w/iron stains & nodules (CL; 4.5'; El 705.5)
5		4.5+		CLAY, gray & tan, hard, w/iron stains & sand seams
		4.5+		
		4.5+		
		4.5+		(CH; 10'; El 700)
10		4.5+		CLAY SHALE, dark gray & tan, hard, w/cemented sand seams & iron stains
15			60	
20				(CH; 22.5' El 687.5)
25			100	SHALE, sandy, dark gray, w/sand seams
				(CL; 27.5'; El 682.5)
30				
35				
40				
45				
50				

Completion Depth: 27.5'
Date: 12-10-86

BAKER-SHIFLETT, INC.

Plate 11a-B.3

LOG OF BORING NO. B-25
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 697± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D., %	MATERIAL DESCRIPTION
0		4.5+			SANDY CLAY, reddish brown, hard, w/iron stains & nodules (CL; 1.5'; El 695.5)
		4.5+			CLAY, w/sand, tan, hard, w/iron stains (CH; 3'; El 694)
5					SAND, tan, medium dense, w/iron stains, w/clay seams (SC; 7'; El 690)
		4.5+			CLAY SHALE, gray & tan, hard, w/gypsum crystals, iron stains, sand seams
		4.5+			
10		4.5+			
		4.5+			
		4.5+			(CH; 15'; El 682)
15			86		SHALE, sandy, dark gray, w/sand & sandstone seams, iron stains
20			96		
25					(CL; 25'; El 672)
30					
35					
40					
45					
50					

Completion Depth: 25'
Date: 12-10-86

BAKER-SHIFLETT, INC.

Plate 11a-B.4

LOG OF BORING NO. B-26
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 716± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
		2.0			SAND, silty, reddish brown, firm, w/iron stains & organic matter (SP; 1.5'; El 714.5)
		4.5			
		4.5			SANDY CLAY, reddish brown, hard, w/iron stains & nodules, small roots (CL; 6'; El 710)
5		4.5			
		3.0			CLAYEY SAND, red & tan, stiff, w/iron stains & nodules
		4.5			
10		3.0			
		4.5			
		4.5			
15		2.5			(SC; 16.5'; El 699.5)
		4.5			
			92		SHALE, dark gray, sandy, w/silty sand seams
20					(CL; 23'; El 693)
25					
30					
35					
40					
45					
50					

Completion Depth: 23'
Date: 12-11-86

BAKER-SHIFLETT, INC.

Plate 11a-B.5

LOG OF BORING NO. B-27
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 708± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
		0.5			SAND w/clay, brown & red, medium dense, w/organic matter (SP; 3'; El 705)
		1.5			
		4.5			CLAYEY SAND, reddish tan & gray, stiff, w/iron stains
5		2.0			
		3.5			
		0.5			
10					(SC; 14.5'; El 693.5)
15		4.5			CLAYEY SAND, reddish tan & gray, w/sandy clay seams
		4.5			CLAY, silty, sandy, gray & tan, hard, w/iron stains & lignite seams (SC; 18.5' El 689.5)
20		4.5+			SHALE, sandy, dark gray
25		4.5+			(CL; 29.5'; El 678.5)
30					
35					
40					
45					
50					

Completion Depth: 29.5'
Date: 12-11-86

BAKER-SHUFLETT, INC.

Plate 11a-B.6

LOG OF BORING NO. B-28
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 704± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
5					CLAYEY SAND, brown, dense, w/clay seams, iron stains (SC; 6'; El 698)
10		4.5+ 4.5+ 4.5+			CLAYEY SAND, red & tan, dense, w/iron stains & nodules (SC; 12'; El 692)
15					SAND, tan, dense, w/sandstone seams, small clay seams (SC; 17'; El 687)
20		4.5 4.5			SHALE, sandy, gray, w/sand seams (CL; 21'; El 683)
25					
30					
35					
40					
45					
50					

Completion Depth: 21'
Date: 12-11-86

BAKER-SHIFLETT, INC.

Plate 11a-B.7

LOG OF BORING NO. B-29
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 731± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
0		4.5			SANDY CLAY, reddish brown, hard, w/iron stains
		4.5			
		2.0			(CL; 4.5'; El 726.5)
5					SANDSTONE, reddish brown, w/iron stains
10					
15					
					(Rock; 18'; El 713)
20		4.5			CLAY, gray, hard, w/iron stains, silty sand seams (CH; 20'; El 711)
					SHALE, sandy, gray
25		4.5			(CL; 25'; El 706)
30					
35					
40					
45					
50					

Completion Depth: 25'
Date: 12-11-86

BAKER-SHIFLETT, INC.

Plate 11a-B.8

LOG OF BORING NO. B-30
PRELIMINARY INVESTIGATION
JOHNSON COUNTY, TEXAS
REPORT NO. 861972

SURFACE ELEVATION: 700± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
0		4.5			CLAY w/sand, tan & brown, hard, w/iron stains & nodules
		4.5			
		4.5			
5		4.5+			
					(CH; 5.5'; El 694.5)
					CLAYEY SAND, whitish tan, w/well cemented seams, iron stains
10					
					(SC; 12.5'; El 687.5)
					SHALE, gray
15					
					(CL; 20'; El 680)
20					
25					
30					
35					
40					
45					
50					

Completion Depth: 20'
Date: 12-11-86

BAKER-SHIFLETT, INC.

Plate 11a-B.9

1987 BAKER-SHIFLETT BORING LOGS

LOG OF BORING NO. A-1
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 4+60 E

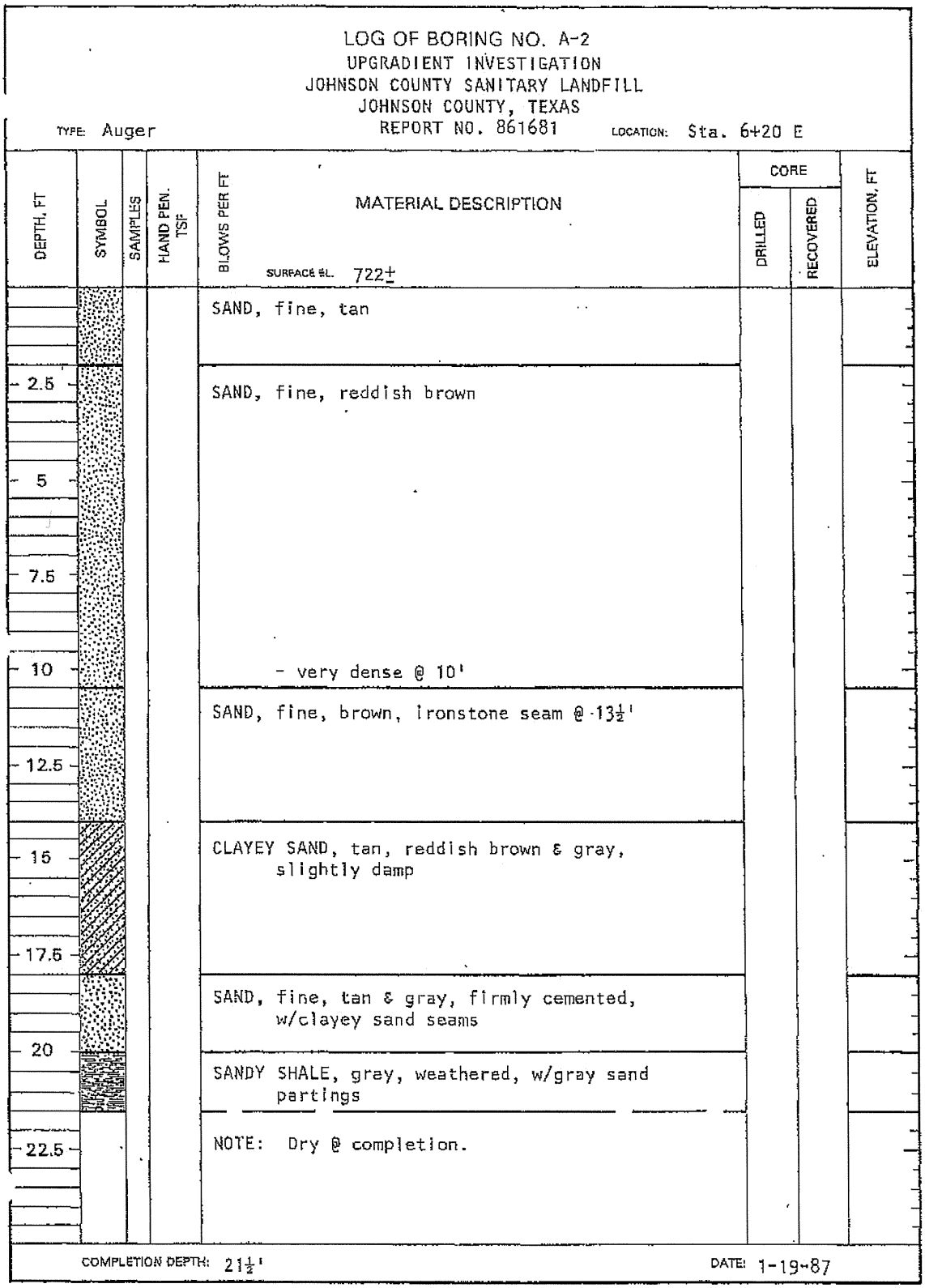
SURFACE EL. 720±

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE: DRILLED	CORE: RECOVERED	ELEVATION, FT
2.5					SAND, fine, tan, reddish brown below 1', cemented below 5½'			
5								
7.5								
10					SAND, fine, tan			
					SAND, fine, purple			
12.5					SAND, fine, light gray, w/gray clay seams, tan & gray sand w/depth			
15					- ironstone seam @ 14'			
17.5					- increasing clay content @ 18½'			
20					CLAY, shaly, gray, w/tan & gray sand seams			
22.5					SANDY SHALE, gray, weathered, w/gray sand partings			
					NOTE: Dry @ completion.			

COMPLETION DEPTH: 23' DATE: 1-19-87

BAKER-SHIFLETT, INC.

Plate 2



BAKER-SHIFLETT, INC.

Plate 3

LOG OF BORING NO. A-3
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 8+15 E

SURFACE EL. 716±

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN, TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
2.5					CLAY, gray, shaly & SHALE, gray (Road Fill)			
5								
7.5								
10					SAND, fine, reddish brown, cemented			
12.5					SAND, fine, light brown			
15					SAND, fine, tan			
17.5					SAND, fine, tan, w/some gray clay seams			
20					SAND, fine, light gray & tan, w/gray clay seams			
22.5					SANDY SHALE, gray, weathered, w/gray sand partings			
					NOTE: Dry @ completion.			

COMPLETION DEPTH: 21½' DATE: 1-19-87

BAKER-SHIFLETT, INC.

Plate 4

LOG OF BORING NO. A-4
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 10+85 E

SURFACE EL. 709±

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
					CLAY, gray, sandy (Road Fill)			
2.5								
					SAND, clayey, gravelly (Road Fill)			
5								
					CLAY, gray, w/tan sand (Road Fill)			
7.5								
					SAND, fine, tan			
10								
12.5					SAND, brown			
					SAND, fine, tan, w/iron staining, damp			
					SAND, fine, light gray & reddish brown, damp			
15								
17.5					CLAY, light gray & tan, w/sand seams			
20								
					CLAY, shaly, gray, w/sand partings			
22.5					- gray weathered sandy shale @ termination			
					NOTE: Dry @ completion. Set temporary piezometer, 20' deep, top flush w/road.			

COMPLETION DEPTH: 23' DATE: 1-19-87

BAKER-SHIFLETT, INC.

Plate 5

LOG OF BORING NO. A-5
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 12+50 E

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE: DRILLED	CORE: RECOVERED	ELEVATION, FT
					SURFACE EL. 707±			
					SANDY CLAY, brown (Road Fill)			
2.5					SAND, fine, reddish brown			
5					SAND, fine, tan			
7.5					SAND, fine, tan, w/gray clay seams, w/light gray, tan, & reddish brown clayey sand pockets			
10								
12.5					SAND, brown, fine to medium			
15					SAND, fine, light gray & brown			
					SAND, fine, tan, slightly damp			
17.5					SANDY CLAY, light gray & tan, w/sand seams, darker gray w/depth			
20								
22.5					CLAY, gray, w/gray sand partings - gray weathered sandy shale @ termination			
					NOTE: Dry @ completion. Auger came up moist w/final cut to 23'. Set piezometer, 20' deep, top flush w/road.			

COMPLETION DEPTH: 23' DATE: 1-19-87

BAKER-SHIFLETT, INC.

Plate 6

LOG OF BORING NO. A-6
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: West of Office

SURFACE EL. 680±

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE DRILLED	CORE RECOVERED	ELEVATION, FT
2.5					SAND, tan & brown			
5								
7.5					SANDY CLAY, tan & grayish brown, w/iron stains			
					CLAY, dark gray & brown			
10					SHALE, gray, sandy			
12.5								
15					NOTE: Water @ 5½'. Temporary piezometer set to 11'. Water @ 2' upon completion.			
17.5								
20								
22.5								

COMPLETION DEPTH: 12' DATE: 1-19-87

BAKER-SHIFLETT, INC.

Plate 7

LOG OF BORING NO. A-7 Page 1 of 2
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 16+50 E

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE: DRILLED	CORE: RECOVERED	ELEVATION, FT
					SURFACE EL. 708±			
					SANDY CLAY & SAND, tan & brown (Road Fill)			
2.5								
					SAND, fine, brown & tan			
5								
7.5								
					SANDY CLAY & CLAYEY SAND, tan			
10								
					SAND, fine, tan, w/reddish brown sand & clay binder			
12.5								
					SAND, fine, reddish brown			
15					- brown sand below 17'			
17.5					SAND, fine, reddish brown, w/tan clay seams			
					SAND, fine, brown			
20					- moist @ 21' (El. 687)			
22.5					SANDY CLAY, tan & gray, w/light gray sand seams			
					SAND, fine, light gray, w/gray shaly clay seams			

- continued on next page -

BAKER-SHIFLETT, INC.

Plate 8

LOG OF BORING NO. A-7 Page 2 of 2
UPGRADIENT INVESTIGATION
JOHNSON COUNTY SANITARY LANDFILL
JOHNSON COUNTY, TEXAS
REPORT NO. 861681

TYPE: Auger LOCATION: Sta. 16+50 E

DEPTH, FT	SYMBOL	SAMPLES	HAND PEN. TSF	BLOWS PER FT	MATERIAL DESCRIPTION	CORE: DRILLED	CORE: RECOVERED	ELEVATION, FT
				SURFACE EL.	SAND, fine, light gray, w/gray shaly clay seams			
					SANDY CLAY, brown & gray			
27.5					SANDY SHALE, weathered, gray, w/sand seams			
30								
32.5					NOTE: Moist @ 21'; wet to moist @ 26'. Temporary piezometer set to 28', top flush w/road. Water @ 26½' @ completion.			
35								
37.5								
40								
42.5								
45								
47.5								

COMPLETION DEPTH: 28' DATE: 1-19-87

BAKER-SHIFLETT, INC.

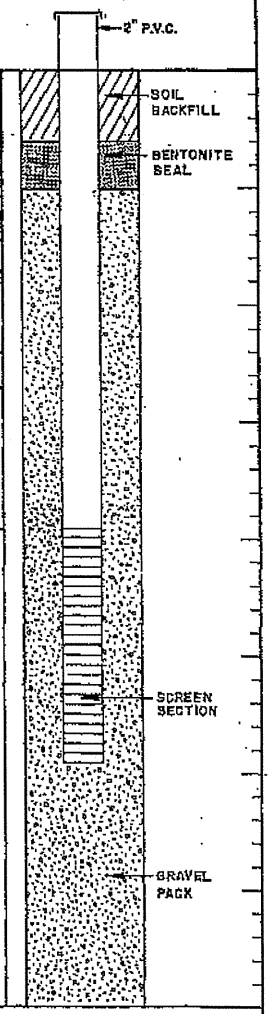
Plate 9

1988-1989 BAKER-SHIFLETT BORING LOGS

LOG OF BORING NO. B-31
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 715.2± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	RQD, %	MATERIAL DESCRIPTION
		2.0			CLAYEY SAND, brown, loose, w/organic material (SC; 1'; El 714.2)
		4.5			
		4.5			
5		4.0			CLAY, w/sand, reddish tan and gray, stiff to very stiff, w/calcareous nodules, w/iron ore deposits, w/organic material, w/gypsum crystals, w/iron stains
		4.5			
		4.5			
10		4.0			(CL; 12'; El 703.2)
		2.0			CLAY SHALE, sandy, brown and reddish brown, w/gypsum crystals, w/iron stains (CH; 13.5'; El 701.7)
		4.5			
15			84		SAND, tan, very dense, clayey, lightly cemented, w/iron ore deposits (SC; 19.5'; El 695.7)
20			100		SHALE, gray, w/silt partings, w/siltstone and sandstone seams, limy w/depth
25					
30			85		
35			79		
					(CL; 40'; El 675.2)
40					
45					
50					



Completion Depth: 40'
Date: 12-5-88

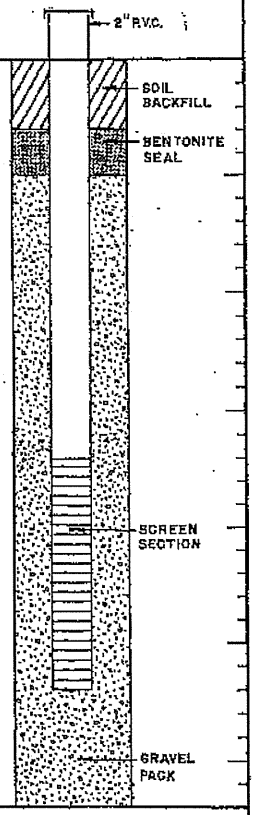
BAKER-SHIFLETT, INC.

Plate 11a-B.10

LOG OF BORING NO. B-32
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 701.5± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
0		2.0 3.0 4.5			SANDY CLAY, brown, stiff, w/organic material (CL; 2'; El 699.5)
5					CLAYEY SAND, reddish tan, medium dense, w/iron stains (SC; 7'; El 694.5)
10			88		SANDSTONE, reddish tan, w/sand seams, w/iron stains (Rock; 12'; El 689.5)
15			88		SAND, reddish tan, very dense, clayey, lightly cemented, w/iron stains (SC; 22.5'; El 679.0)
25			90		SHALE, gray, w/lignite, w/siltstone seams, w/silt partings (CH; 32'; El 669.5)
30					
35					
40					
45					
50					



Completion Depth: 32'
Date: 12-5-88

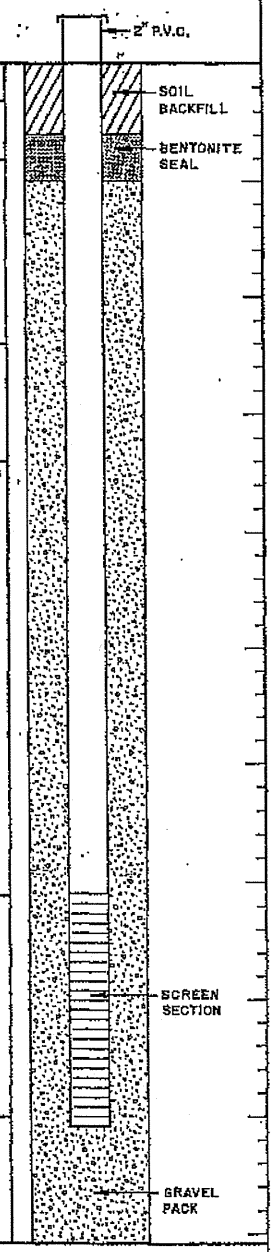
BAKER-SHIFLETT, INC.

Plate 11a-B.11

LOG OF BORING NO. B-33
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 710.1± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
0		0.0			SAND, brown, loose, fine, w/organic material (SP; 1.5'; El 708.6)
		4.5+			
		4.5+			SANDY CLAY, reddish brown to red, dense, w/iron ore deposits, w/organic material (CH; 4'; El; 706.1)
5		4.5+			
		0.5			
10			92		CLAYEY SAND, reddish brown, clayey, dense, lightly cemented, w/iron ore deposits (SC; 12'; El 698.1)
15			94		SANDSTONE, red/brown, w/sand seams, w/iron ore deposits (Rock; 17'; El 693.1)
20			68		SAND, reddish brown, w/iron ore deposits, w/moderately cemented layers
25			58		
30			29		(SP; 35.5'; El 674.6)
35					
40			24		SAND, tan, clayey, w/sandstone seams and layers, w/iron stains (SP; 45'; El 665.1)
45			100		SHALE, gray, w/siltstone seams, w/fossils (CH; 50.5'; El 659.6)
50					



Completion Depth: 50.5'
Date: 12-6-88

BAKER-SHIFLETT, INC.

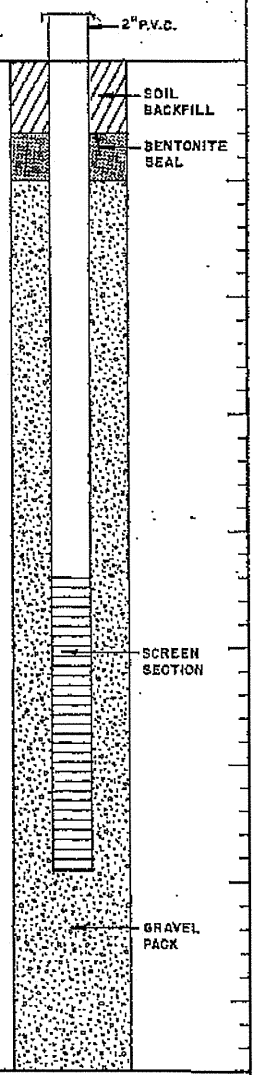
Plate 11a-B.12

LOG OF BORING NO. B-34

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 702.8± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	RQD, %	MATERIAL DESCRIPTION
0		4.5+			CLAYEY SAND, reddish brown, dense, w/iron ore gravel, w/iron stains (SC; 5.5'; El 697.3)
5		4.5+	70		SANDSTONE, reddish tan and reddish brown, w/clayey sand seams. (Rock; 10.5'; El 692.3)
10					SAND, reddish tan and reddish brown, dense, w/moderately cemented seams (SP; 20'; El 682.8)
15			50		
20					CLAYEY SAND, reddish tan and reddish brown, dense (SC; 22'; El 680.8)
25			30		SAND, light yellowish brown, w/sandstone seams, w/iron stains (SP; 23'; El 679.8)
30					SHALE, gray to dark gray, w/siltstone seams, w/silt partings
35			90		
40			83		(CH; 43'; El 659.8)
45					
50					



Completion Depth: 43'
Date: 12-7-88

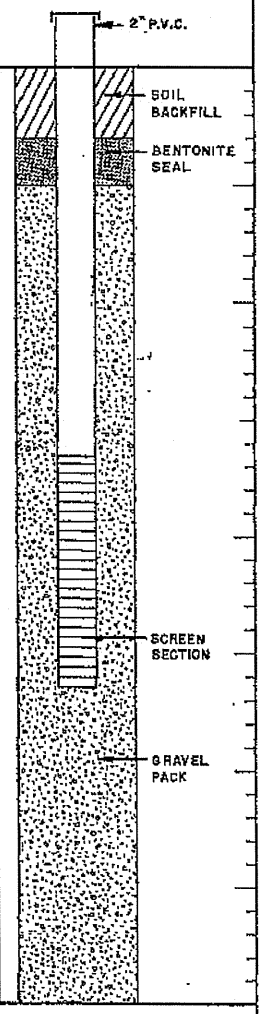
BAKER-SHIFLETT, INC.

Plate 11a-B.13

LOG OF BORING NO. B-35
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 685.0± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
0		0.5			CLAYEY SAND, very loose, light brown and red/tan, w/organic material (SP-SC; 1.5')
5		3.5 4.5 4.5 4.5			CLAYEY SAND, brown and tan to tan and reddish brown, medium dense, w/iron stains
10			100		- lightly cemented w/some well cemented seams
15			92		- alternating shale and sand seams and layers, red/brown and gray at 12'-17' (SC; 17'; El 668)
20			89		SHALE, gray to dark gray, w/silt partings and siltstone seams
25			96		
30					(CH; 35'; El 650)
35			50		SAND, gray, w/shale seams, w/lignite seams, w/siltstone seams and layers (SC; 40'; El 645)
40					
45					
50					



Completion Depth: 40'
Date: 12-6-88

BAKER-SHIFLETT, INC.

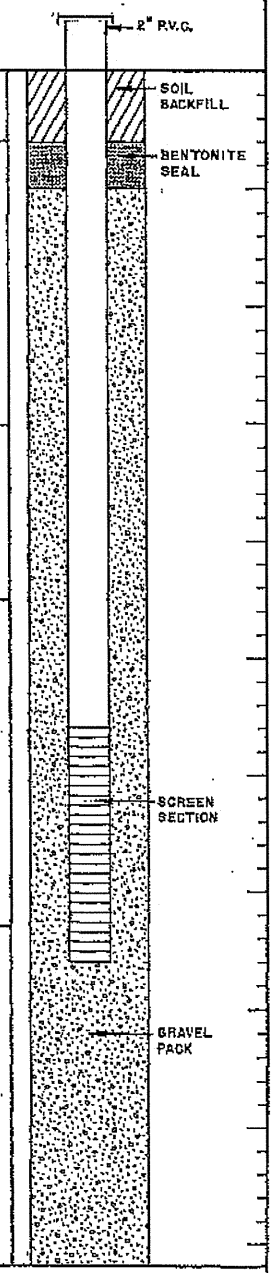
Plate 11a-B.14

LOG OF BORING NO: B-36 Page 1 of 2

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 706 ±0 LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
0					SAND, tan, dense, w/organic material, w/iron stains (SP; 3'; El 703)
5		3.0 4.5	90		CLAYEY SAND, tan and reddish tan, medium dense, w/organic material, w/iron stains, lightly to moderately cemented seams
10			67		(SC; 15'; El 691)
15					SANDY CLAY, brown to tan and gray, very stiff, limy, w/fossils, w/iron stains
20			65		(CL; 22.5'; El 683.5)
25			100		SHALE, sandy, dark gray to gray, limy, w/fossils, w/silt partings
30					
35			100		(CL; 36.5'; El 669.5)
40					SHALE, gray to dark gray, w/siltstone seams
45			88		
50					



Completion Depth:
Date:

Continued

BAKER-SHIFLETT, INC.

Plate 11a-B.15

LOG OF BORING NO. B-36 Page 2 of 2
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 706.0 ± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	RQD, %	MATERIAL DESCRIPTION
55			79		SHALE, gray to dark gray, w/siltstone seams (CH; 53'; El 653)
					SHALE, gray, sandy, w/sandstone seams at termination (CL; 57'; El 649)

GRAVEL PACK

Completion Depth: 57'
Date: 12-7-88

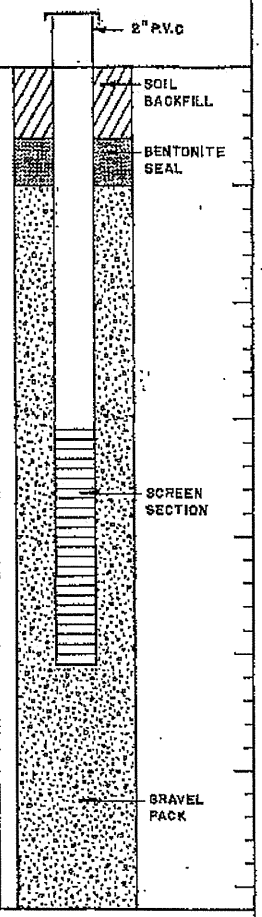
BAKER-SHIFLETT, INC.

Plate 11a-B.16

LOG OF BORING NO. B-37
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 697.9± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R Q D, %	MATERIAL DESCRIPTION
0		0.0			SAND, red/brown, loose, fine, w/organic material (SP; 2'; El 695.9)
		4.5			
		4.5+			
5		4.5+			CLAYEY SAND, red/tan to red/tan and gray, medium to very dense, w/iron stains
		4.5+			
					- light gray below 8.5'
10		4.5+			
					- red/brown and tan below 11.5'
		4.5+			
		4.5			- light gray and tan below 13.5'
15					
20			43		(SC; 22'; El 675.9)
					CLAY, w/sand, gray and red/brown, hard w/iron stains (CL; 25';)
25					- light gray, shaly below 23.5' (El 672.9)
			84		SHALE, gray, w/silt partings, w/lignite stains, w/siltstone seams
30					
			25		(CH; 36'; El 661.9)
35					
40					
45					
50					



Completion Depth: 36'
Date: 12-6-88

BAKER-SHIFLETT, INC.

Plate 11a-B.17

LOG OF BORING NO. B-38
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 710.2± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	R.Q.D. %	MATERIAL DESCRIPTION
		2.5			CLAYEY SAND, brown, medium dense (SC; 1'; El 709.2)
		4.5+			CLAY, brown to reddish brown and gray, stiff to hard, w/scattered iron gravel, w/iron stains (CH; 4.5'; El 705.7)
5		4.5+			
		4.5+			
		4.5+			
		4.5+			SANDY CLAY, reddish brown and gray to reddish tan and gray, very stiff to hard, w/calcareous nodules and particles, w/iron ore deposits, w/iron stains and nodules (CL; 14'; El 696.2)
10		4.5			
15			100		CLAY SHALE, sandy, reddish brown and gray, w/iron ore deposits, w/iron stains (CL; 16.5'; El 693.7)
20			83		SHALE, gray, sandy, w/lignite seams, w/silt partings
25			58		CL; 35'; El 675.2)
30					
35			82		SHALE, gray, w/lignite stains, w/calcareous seams, w/fossils, w/siltstone seams
40					- conglomerate seam (3") @ 35.5'
45			86		(CH; 45.5'; El 664.7)
					SHALE, gray, laminated sand and silt partings, w/siltstone seams (CL; 50'; El 660.2)
50					

2" P.V.C.
SOIL BACKFILL
BENTONITE SEAL
SCREEN SECTION
GRAVEL PACK

Completion Depth: 50'
Date: 12-5-88

BAKER-SHIFLETT, INC.

Plate 11a-B.18

LOG OF BORING NO. B-39
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 697.4± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
				SAND, tan to reddish tan, w/calcareous nodules, iron stains & organics (SP; 2'; El 695.4)
5				CLAYEY SAND, reddish brown to tan, w/iron stains
10				
				(SC; 14.5'; El 682.9)
15				SANDSTONE, reddish brown, w/iron stains (16') El 681.4
20			100	SANDY CLAY, shaly, tan & gray, w/iron stains & sand seams - gray below 17.5'
				(CL; 23.5'; El 673.9)
25				SAND, gray, very dense, lightly cemented, w/clay seams
30			100	- siltstone seam: 27'
				(SP; 32.5'; El 664.9)
35				SHALE, gray, w/sand partings, w/siltstone seams
40			100	
45			100	
50				

2" P.V.C.
BENTONITE SEAL
GRAVEL PACK

Continued

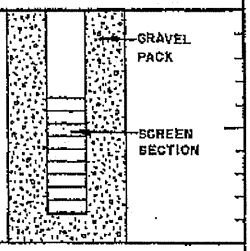
BAKER-SHIFLETT, INC.

Plate 11a-B.19

LOG OF BORING NO. B-39
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 697.4± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
55			80	See description on previous page (CL; 53.5'; El 643.9)
				SAND, gray, very dense, lightly cemented, w/shale seams, lignitic (SP-SC; 56'; El 641.4)
60				SHALE, gray, w/sand partings & siltstone seams (CL; 60'; El 637.4)



Completion Depth: 60'
Date: 4-17-89

BAKER-SHIFLETT, INC.

Plate 11a-B.20

LOG OF BORING NO. B-40
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 707.0± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
				SAND, tan, loose, w/organic material (SP; 4'; El 703)
5				SANDY CLAY, reddish brown, w/iron stains (CL; 6'; El 701)
				SAND, tan, loose, w/iron stains (SP; 6.5'; El 700.5)
10				CLAYEY SAND, red & tan, w/organic material, w/iron stains (SC; 8.5'; El 698.5)
				SAND, tan & brown, w/sandstone seams, w/iron stains (SP; 16'; El 691)
15				
				SAND, tan, moderately cemented, w/iron ore deposits (SP; 20'; El 687)
20				SANDSTONE, tan & gray, well cemented (21'; El 686)
				SAND, dark brown, w/iron stains & deposits (SP; 22'; El 685)
25			50	SHALE, gray, sandy, w/siltstone seams (CL; 29'; El 678)
30			50	SHALE, w/sand, dark gray, w/siltstone seams, & fossils
35				
40			63	(CH; 44'; El 663)
45			95	SHALE, w/sand, dark gray, w/siltstone partings, seams & layers, w/sandstone seams, & iron stains
50				

2" P.V.C.
BENTONITE SEAL
GRAVEL PACK

Continued

BAKER-SHIFLETT, INC.

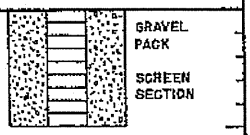
Plate 11a-B.21

LOG OF BORING NO. B-40

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 707.0± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
55			95	SHALE, w/sand, dark gray, w/siltstone partings, seams and layers, w/sandstone seams, & iron stains
60			33	(CL; 60'; El 647)



65 70 75 80 85 90 95 100

Completion Depth: 60.0'
Date: 4-6-89

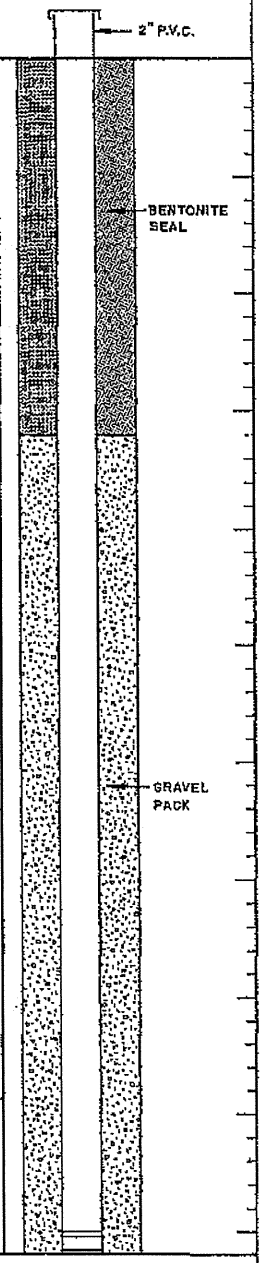
BAKER-SHIFLETT, INC.

Plate 11a-B.22

LOG OF BORING NO. B-41
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 705.3± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
0				SAND, clayey, reddish brown, w/ironstone gravel
				(SC; 12'; El 693.3)
				CLAY, sandy, light reddish brown & tan
				- sandstone seam below 17.5'
				(CL; 18'; El 687.3)
			75	SHALE, sandy, gray
				- clayey below 19.5'
			100	
				- siltstone seam: 33'
			94	- sandstone layer: 41 - 41.5'
				- fossiliferous below 42'
				(CH; 44.5'; El 660.8)
			60	SAND, gray, dense, w/lightly cemented seams, w/shale & clay layers, fossiliferous



Continued

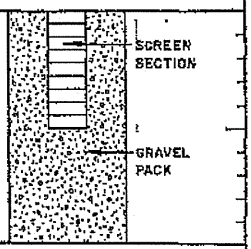
BAKER-SHIFLETT, INC.

Plate 11a-B.23

LOG OF BORING NO. B-41
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 705.3± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
55			45	SAND, gray, dense, w/lightly cemented seams, w/shale & clay layers, fossiliferous - w/lignite partings below 50.5' (SC; 60'; El 645.3)
60				
65				
70				
75				
80				
85				
90				
95				
100				



Completion Depth: 60.0'
Date: 4-4-89

BAKER-SHIFLETT, INC.

Plate 11a-B.24

LOG OF BORING NO. B-42
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 695.5± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
		2.0		SANDY CLAY, brown, stiff w/oxide stains - w/gravel below 0.5' (CL; 2'; El 693.5)
		4.5+		SAND, w/clay, tan, red & gray, dense,
		4.5+		w/ironstone concretions (SC; 4.5'; El 691)
5		4.5+		CLAYEY SAND, tan, red & gray, dense (SC; 6'; El 689.5)
		4.5+		CLAY, w/sand, gray & tannish red, hard,
		4.5+		w/silty sand partings, oxide stains
10		4.5+		- slightly shaly, w/gypsum & sulphur partings
		4.5+		
		4.5+		(CL; 14.5'; El 681)
15		4.5+		SAND, light brown, dense (SP; 16'; El 679.5)
				CLAY, gray, hard, w/sand partings (CL; 17'; El 678.5)
			90	
20				SHALE, gray, fossiliferous, w/siltstone
				seams & sand partings
			100	
25				
30				(CL; 32.5'; El 663)
			50	SANDSTONE, tan & red, oxide stains, lightly to
35				moderately cemented, w/sand partings
				- shale layer: 32'
40				(Rock; 40'; El 655.5)
45				
50				

2" P.V.C.
BENTONITE SEAL
GRAVEL PACK
SCREEN SECTION

Completion Depth: 40.0'
Date: 2-23-89

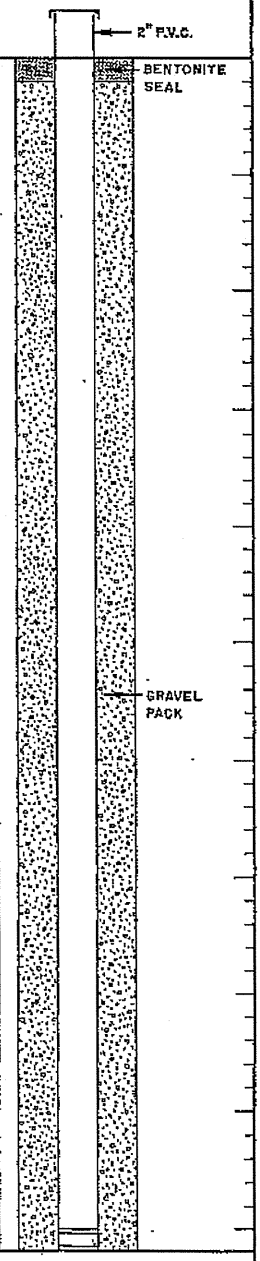
BAKER-SHIFLETT, INC.

Plate 11a-B.25

LOG OF BORING NO. B-43
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 711.4± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
5				SANDY CLAY, light reddish brown, w/organic material, w/iron stains
				- sandier below 8' (CL; 8'; El 703.4)
10				SAND, tan, w/iron stains
				(SP; 12'; El 699.4)
				SAND, dark brown & tan, lightly cemented w/iron ore deposits (SP; 14'; El 697.4)
15				CLAYEY SAND, tan, w/iron stains
				(SC; 18'; El 693.4)
20				SAND, tan, cemented, w/iron stains (SP; 19'; El 692.4)
			88	SHALE, dark gray, w/siltstone seams, w/lignite partings, w/sand partings, w/fossils
25				
30			70	
35				
				(CL; 40'; El 671.4)
40			80	SHALE, sandy, gray, fossiliferous
45				- sandstone layer: 43 - 44'
			85	
50				



Continued

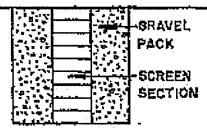
BAKER-SHIFLETT, INC.

Plate 11a-B.26

LOG OF BORING NO. B-43
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 711.4± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Panetrometer, TSF Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
55			85	SHALE, gray, w/siltstone seams, & sand partings
60			100	(CH; 60'; EI 651.4)



Completion Depth: 60.0'
Date: 4-5-89

BAKER-SHIFLETT, INC.

Plate 11a-B.27

LOG OF BORING NO. B-44
JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS
REPORT NO. 882385

SURFACE ELEVATION: 673± LOCATION: See Plan of Borings

Depth, Ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Recovery, %	MATERIAL DESCRIPTION
				CLAYEY SAND, reddish brown & tan, w/iron stains (SC; 2.5'; El 670.5)
5				SAND, reddish brown & tan - wet below 4' - reddish brown & gray below 9' (SP; 13'; El 660)
15				SHALE, sandy, light gray, w/sand partings (CL; 18'; El 655)
20				
25				
30				
35				
40				
45				
50				

Completion Depth: 18.0'
Date: 4-18-89

BAKER-SHIFLETT, INC.

Plate 11a-B.28

1990 BAKER-SHIFLETT

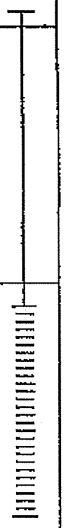
GROUNDWATER MONITOR WELL BORING LOGS

LOG OF BORING NO. MW-2B

JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS

Approx. Surface Elevation: 669.5 ft. Location: See Plan of Borings

Depth, ft.	MATERIAL DESCRIPTION	
5	SAND, clayey, silty, red tan, loose to firm w/increasing depth	(5.0')
10	CLAY, sandy, silty, w/alternating clayey sand seams & layers, red tan, w/ironstone concretions, lignite, gypsum, & sulfur seams & partings	
15		(15.0')
20	SAND, clayey, silty, red tan, w/ironstone concretions, lignite & gypsum - light gray, shaly below 20.0 ft.	(22.5')
25	SHALE, clayey, w/fine sand, dark gray to gray	
30	- siltstone seam (0.2 ft.) @ 31.8 ft., olive tan, very hard	(32.5')
35		
40		
45		
50		



Completion Depth: 32.5 Feet
Date: 10-11-90
Project Number: 861681.90

Notes: Boring bailed to 29.5 ft. upon completion.
- 10" diameter fishtail bit w/drilling water used 0.0 ft. to 32.5 ft.
- Drilling water from City of Fort Worth & City of Alvarado, Texas.
- Grout - 2.5 ft. to 11.0 ft.; 24.0 ft. to 32.5 ft.
- Cement grout - 0.0 ft. to 2.5 ft.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.37

LOG OF BORING NO. MW-3B

JOHNSON COUNTY LANDFILL
ALVARADO, TEXAS

Approx. Surface Elevation: 654.1 Location: See Plan of Borings

Depth, ft.	MATERIAL DESCRIPTION	
	SAND, clayey, silty, w/gravel, light red tan, firm	(2.5')
5	CLAY, sandy silty, light red tan	
	- olive tan & red, w/gypsum, sulfur, & ironstone fragments below 6.0 ft.	
10		
15	- very light gray below 16.0 ft.	
20		(21.5')
	CLAY, shaly, gray to dark gray	(24.0')
25		
30		
35		
40		
45		
50		



Completion Depth: 24.0 Feet
Date: 10-10-90
Project Number: 861681.90

Notes: Boring bailed to 21.0 ft. upon completion.
- 10" diameter fishtail bit w/drilling water used 0.0 ft. to 24.0 ft.
- Drilling water from City of Fort Worth & City of Alvarado, Texas
- Grout - 2.5 ft. to 11.7 ft.
- Cement grout - 0.0 ft. to 2.5 ft.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.38

1991 BAKER-SHIFLETT BORING LOGS

LOG OF BORING NO. B - 9A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 714.2 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
					SAND, reddish brown, lightly cemented (SP-SC; 3.0'; EL. 711.2)
5					SANDY CLAY, tan & light gray, w/iron stains (CL; 7.5'; EL. 706.7)
10					CLAY, shaly, gray, w/sandstone seams (CL-CH; 16.2'; EL. 698.0)
15					
20					SHALE, gray, w/siltstone seams
25					
30					- w/sandstone layers below 30 ft.
35					
40					
45	C- 1			87	
50					(CH-CL; 49.5; EL 664.7)

Completion Depth: 100.0 Feet
Date: 1-31-91
Project Number: 882885

- LOG CONTINUED ON NEXT PAGE -

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.29

LOG OF BORING NO. B - 9A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 714.2 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
55	C- 1			70	SHALE, sandy, gray, w/sand layers & sandstone layers
					(CL; 58.0'; EL. 656.2)
60					SAND, light gray, w/sandstone seams & shale seams
65	C- 2			50	
					(SP-SC; 69.0'; EL. 645.2)
70					SHALE, gray, w/sand partings & seams, w/siltstone seams
75	C- 3			70	
80					
85	C- 4			62	
					(CL; 86.5'; EL. 627.7)
90					SAND, light gray, moderately cemented
					- w/shale partings below 91.5 ft.
					(SP-SC; 93.5'; EL. 620.7)
95	C- 5			95	SAND & SHALE, dark & light gray, laminated
					(SC-CL; 97.9'; EL. 616.9)
100					SHALE, dark gray, w/sand partings
					(CL; 100.0'; EL. 614.2)

Completion Depth: 100.0 Feet
Date: 1-31-91
Project Number: 882385

Note: Water used as drilling fluid. Upon completion, 2-inch PVC piezometer installed as shown.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.30

LOG OF BORING NO. B - 32A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 702.0 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
					SANDY CLAY, brown, w/iron stains (CL; 3.0'; EL. 699.0)
5					CLAYEY SAND, reddish tan, w/iron stains (SC; 7.0'; EL. 695.0)
10					SANDSTONE, reddish tan, w/sand seams, w/iron stains (ROCK; 12.0'; EL. 690.0)
15					SAND, reddish tan, clayey, lightly cemented, w/iron stains
20					
25					(SC-SP; 27.5'; EL. 674.5)
30					SHALE, gray, sandy, w/sand partings & seams
35					
40					
45	C- 1			98	
50					(Cont'd)

Completion Depth: 92.0 Feet
Date: 1-24-91
Project Number: 882385

- LOG CONTINUED ON NEXT PAGE -

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.31

LOG OF BORING NO. B - 32A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 702.0 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
					See Previous Page for Description (CH-CL; 61.5'; EL. 650.5)
55	C- 1			20	SAND, gray, lightly cemented, w/occasional shale seams
60					
65	C- 2			61	
70					
75	C- 3			64	(SC-SP; 75.5'; EL. 626.5)
					SANDSTONE, light gray (ROCK; 77.0'; EL. 625.0)
80					SHALE, gray, w/siltstone seams
85	C- 4			93	
90					(CH-CL; 92.0'; EL 610.0)
95					
100					

Completion Depth: 92.0 Feet
Date: 1-24-91
Project Number: 882385

Note: Water used as drilling fluid. Upon completion, 2-inch PVC piezometer installed as shown.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.32

LOG OF BORING NO. B - 36A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 705.9± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Unified Classification System	MATERIAL DESCRIPTION
				SAND, tan, w/organic material (SP; 3.0'; EL. 702.9)
5				CLAYEY SAND, tan & reddish tan, w/iron stains
10				
				- w/light gray clay seams below 12 ft.
15				(SC; 19.5'; EL. 686.4)
20				SANDY CLAY, tan & gray, w/iron stains (CL; 22.5'; EL. 683.4)
25				SHALE, sandy, dark gray to gray, w/silt partings
30				(CL; 32.0'; EL. 673.9)
				SHALE, gray to dark gray, w/siltstone seams
35				
40				
45				
50				(Cont'd)

Completion Depth: 85.0 Feet
Date: 1-29-91
Project Number: 882385

- LOG CONTINUED ON NEXT PAGE -

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B33

LOG OF BORING NO. B - 36A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 705.9± Location: See Plan of Borings

Depth, ft	Samples	Penetrometer, TSF Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
					See Previous Page for Description (CH; 52.6', EL. 653.4)
55					SHALE, sandy, gray, w/sand partings (CL; 59.3'; EL. 646.6)
60	C- 1			55	SHALE, w/sand seams & partings, gray (CL; 60.2'; EL. 645.7)
					SANDSTONE, dark brown (ROCK; 61.0'; EL. 644.9)
65					SHALE, sandy, gray, w/sand partings (CL; 65.0'; EL. 640.9)
					SAND, w/shale seams, gray, poorly cemented
70	C- 2			55	(SC; 70.5'; EL. 635.4)
					SAND & SHALE, laminated, light gray & dark gray, w/sandstone seams (SP-CL; 74.0'; EL. 631.9)
75					SHALE, w/sand partings, dark gray, w/sandstone & siltstone seams & partings, w/some sand & shale laminating
80	C- 3			62	
85					(CL; 85.0'; EL. 620.9)
90					
95					
100					

Completion Depth: 85.0 Feet
Date: 1-29-91
Project Number: 882385

Note: Water used as drilling fluid. Water loss during drilling observed near 10 ft. & 71 ft. Upon completion, 2-inch PVC piezometer installed as shown.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.34

LOG OF BORING NO. B - 44A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 670.2 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
5					SAND & CLAYEY SAND, reddish brown & tan, w/iron deposits & clay seams, occasional sandstone fragments
10					
15					(SP-SC; 13.7'; EL. 656.5)
					CLAY, gray & tan, shaly
20					(CL-CH; 17.0'; EL. 653.2)
	C- 1			92	SHALE, gray, w/sand partings
25					(CL-CH; 23.7'; EL. 646.5)
	C- 2			80	SHALE & SAND, laminated
30					
	C- 3			88	
35					(CL; 37.0'; EL. 633.2)
40	C- 4			60	SHALE, gray, sandy, w/sand seams
45					
	C- 5			94	
50					(Cont'd)

Completion Depth: 65.0 Feet
Date: 1-24-91
Project Number: 882385

- LOG CONTINUED ON NEXT PAGE -

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

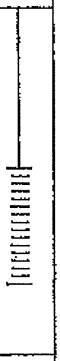
Plate 11a-B.35

LOG OF BORING NO. B - 44A

JOHNSON COUNTY LANDFILL EXPANSION
JOHNSON COUNTY, TEXAS

Approx. Surface Elevation: 670.2 ± Location: See Plan of Borings

Depth, ft.	Samples	Penetrometer, TSF / Penetration Resistance, Blows/Ft.	Unified Classification System	Recovery, %	MATERIAL DESCRIPTION
55	C- 1			55	- Sandstone layer 50.8 ft. to 51.6 ft. - Cemented sand, w/shale seams 52 ft. to 54 ft. (CL; 56.0'; EL. 614.2)
60					SAND, gray, w/occasional shale seams (SP-SC; 61.5'; EL. 608.7)
65					SHALE, gray (CL-CH; 66.0'; EL. 605.2)
70					
75					
80					
85					
90					
95					
100					



Completion Depth: 65.0 Feet
Date: 1-23-91
Project Number: 882885

Note: Water used as drilling fluid. Upon completion, 2-inch PVC piezometer installed as shown.

BAKER-SHIFLETT, INC.

THE STRATIFICATION LINES REPRESENT APPROXIMATE STRATA BOUNDARIES. IN SITU, THE TRANSITION MAY BE GRADUAL.

Plate 11a-B.36

1992-1993 EMCON

GROUNDWATER MONITOR WELL BORING LOGS

LOG OF MONITOR WELL NO. MW- 1C

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 685.8'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	SB-1		SILTY SAND (SM), reddish brown, fine-grained, loose to medium dense & poorly cemented, dry, iron stained w/ironstone, sandstone seam at 3.7 ft., sandy shale layer from 4.5 to 5 ft., w/gypsum		7					17	
5	SB-2		SHALY SAND, dark reddish brown, fine-grained, slightly moist, calcareous w/calcareous inclusions	5.0							
			SAND w/silt (SP-SM), light gray, fine-grained, poorly graded, loose to medium dense & poorly cemented w/organics, moist & moderately cemented below 8 ft.	7.0	11					7	
10	SB-3		SHALE w/sand, gray w/reddish brown sand, stiff, slightly moist, iron stained w/ironstone, limonitic, interbedded w/sand partings & seams	8.8	18		34	14	20	62	
15				13.5	19		46	19	27	84	
20											
25											
30											
35											
40											
45											
50											

Completion Depth: 13.5 ft.
Date Boring Started: 12/7/92
Date Boring Completed: 12/7/92
Engineer/Geologist: MB
Project No.: 5200-001-091

Remarks: Borehole augered to 13.5 ft; monitoring well installed to 13 ft.
Water level measured at 9.91 ft on 12-28-92.

EMCON BAKER-SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson Co. Landfill
County: Johnson
Date of Monitor Well Installation: 12-7-92
Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient X

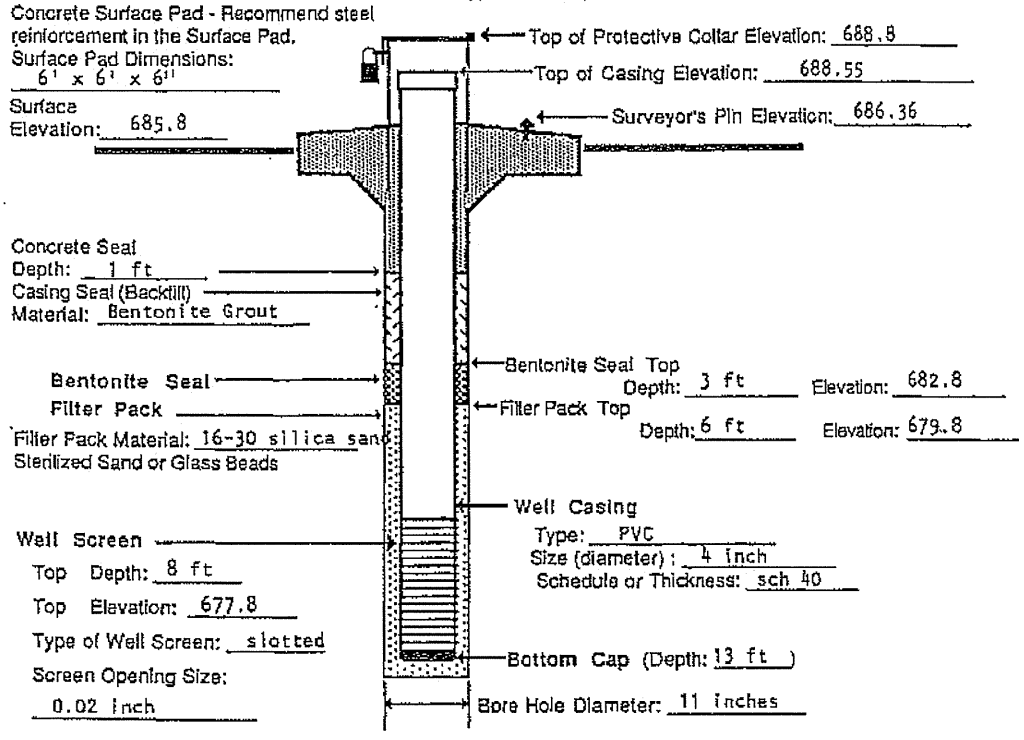
TDH Permit No. : 14178
Monitor Well I.D. No.: MW-1C
Date of Monitor Well
Development: Dec. 21-28, 1992
Monitor Well Driller
Name: Nick Moericke
License No.: 02932M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Mike Brown (Baker-Shiflett/EMCON)
Static Water Level Elevation (with respect to MSL) after Well Developement : 678.64
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" steel casing



LOG OF MONITOR WELL NO. 4B

Project Description: JOHNSON COUNTY LANDFILL
Johnson County, Texas

Location: E 2837.6 N 592.6
Surface El.: 678.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	U-1		CLAY, w/sand laminations, gray, yellow & red, moist, stiff to hard, mottled, w/ironstone concretions								
	U-2										
2.5											
	U-3		SAND, w/clay seams, gray, yellow & red, moist, very dense, mottled, fine to medium								
4.5											
5	U-4		SHALE, w/sand laminations, gray brown, yellow & red, very stiff to hard, w/gypsum, weathered								
	U-5										
	U-6										
	U-7										
10	U-8										
	U-9										
	U-10										
15	U-11										
	U-12		- wet @ 16.0 ft.								
	C-13		- dark gray, carbonaceous from 16.5 to 21.0 ft.								
20			- more sandy below 19.5 ft.								
			- siltstone seam @ 21.0 ft.								
			- unweathered below 21.0 ft.								
	C-14										
25	C-15		- siltstone seam @ 25.0 ft.								
27.0			- siltstone seam @ 26.6 ft.								
			SHALE, clayey (CH), dark gray, moist				54	22	32	99	
			- siltstone seam @ 27.2 ft.								
30	C-16										
			- w/sand laminations, very light gray, fossiliferous from 32.7 to 39.0 ft.								
35	C-17		- carbonaceous from 35.3 to 39.0 ft.								
			- siltstone seam @ 39.2 ft.								
40	C-18										
42.6											
			SILTY SAND (SP-SM), w/shale seams, light gray & tan gray, moist, poorly indurated, mottled				25	22	3	10	
45	C-19		- wet below 44.0 ft. depth								
50.0											

Completion Depth: 60.0 ft.
Date Boring Started: 1/3/92
Date Boring Completed: 1/4/92
Engineer/Geologist: G.E.S/D.D.J.
Project No.: 861681.90

Remarks: Boring completed with monitor well. Monitor well completed at the surface with 6' x 6' concrete surface pad. See attached monitor well detail sheet.

Continued Next Page

BAKER - SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

LOG OF MONITOR WELL NO. 4B

Project Description: JOHNSON COUNTY LANDFILL
Johnson County, Texas

Location: E 2837.6 N 592.6
Surface El.: 678.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
50	C-20		SHALE, w/sand laminations, gray & light gray, moist — 51.2								
55	C-21		SILTY SAND (SP-SM), w/clayey shale laminations & seams (CL), light gray & gray, wet, loose to medium dense, slightly calcareous — 60.0				35	15	20	67	
60											
65											
70											
75											
80											
85											
90											
95											
100											

Completion Depth: 60.0 ft.
Date Boring Started: 1/3/92
Date Boring Completed: 1/4/92
Engineer/Geologist: G.E.S/D.D.J.
Project No.: 861681.90

Remarks: Boring completed with monitor well. Monitor well completed at the surface with 6' x 6' concrete surface pad. See attached monitor well detail sheet.

BAKER - SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

TDH Permit No. : 1417B

County: Johnson

Monitor Well I.D. No.: MW-4B

Date of Monitor Well Installation: 1/4/92

Date of Monitor Well Development: 1/16, 1/20, 1992

Monitor Well: Latitude: 32°21.27' Longitude: W97°12.14'

Monitor Well Driller Name: Donald D. James

Monitor Well Groundwater Gradient: Upgradient ___ Downgradient X

License No.: 3257M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald D. James, C.P.G.

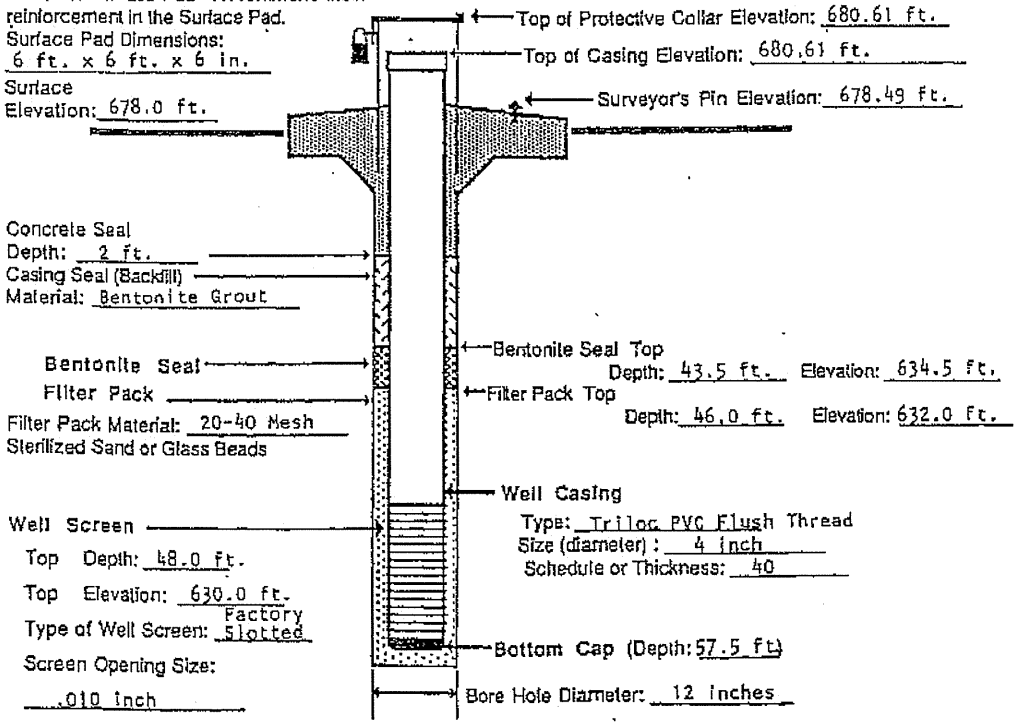
Static Water Level Elevation (with respect to MSL) after Well Development: _____

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Hinged Top w/Master Lock

Type of Casing Protection: 6 in. x 6 in. square, steel

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6 ft. x 6 ft. x 6 in.
Surface Elevation: 678.0 ft.



LOG OF MONITOR WELL NO. MW- 5B

Project Description: JOHNSON COUNTY LANDFILL
Johnson County, Texas

Location: S 1275.0 W 353.0
Surface El.: 716.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	A-1		CLAYEY SAND (SC), w/gravel, light tan and gray, (fill) 1.8								
			SANDY CLAY (CL), w/clay seams, brown, wet, soft								
	S-2		- w/gravel, w/gray and red, w/oxide stains below 3.9 ft. 6.0								
5			SANDSTONE (SP-SC), yellow red, moderately cemented 6.9		17		29	15	14	8	
			CLAYEY SAND (SC), dark red-brown and gray, wet, poorly-noncemented 8.0								
	A-3		SANDSTONE (SP-SC), w/loose clayey sand seams, yellow red, wet, moderately cemented, w/oxide stains								
	S-4										
10	A-5										
			13.5								
	S-6		CLAYEY SAND (SC-SM), red brown and very dark gray, wet, dense, w/oxide stains							16	
15			- w/gravel below 16.0 ft.								
	J-7		17.5		18						
	J-8		SANDY CLAY (CL), w/sand laminae, gray and dark gray, moist, very stiff. 18.5								
20											
25											

Completion Depth: 18.5 ft.
Date Boring Started: 7/30/90
Date Boring Completed: 7/30/90
Engineer/Geologist: DDJ
Project No.: 5200-001-090

Remarks: Pilot boring drilled and sampled 7/1/92 to a total depth of 20.0 ft. Pilot bore hole grouted upon completion using the tremie method. Boring for monitoring well drilled 7/30/92 to a total depth of 18.5 ft.

BAKER - SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE, 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

County: Johnson

Date of Monitor Well Installation: 7/30/92

Monitor Well: Latitude: 32° 21.27' Longitude: 97° 12.14'

Monitor Well Groundwater

Gradient: Upgradient X Downgradient ____

TDH Permit No. : 1417B

Monitor Well I.D. No.: MW-5B

Date of Monitor Well

Development: 8/10, 8/11, 1992

Monitor Well Driller

Name: Joby Barr

License No.: 3182 DM

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald O. James

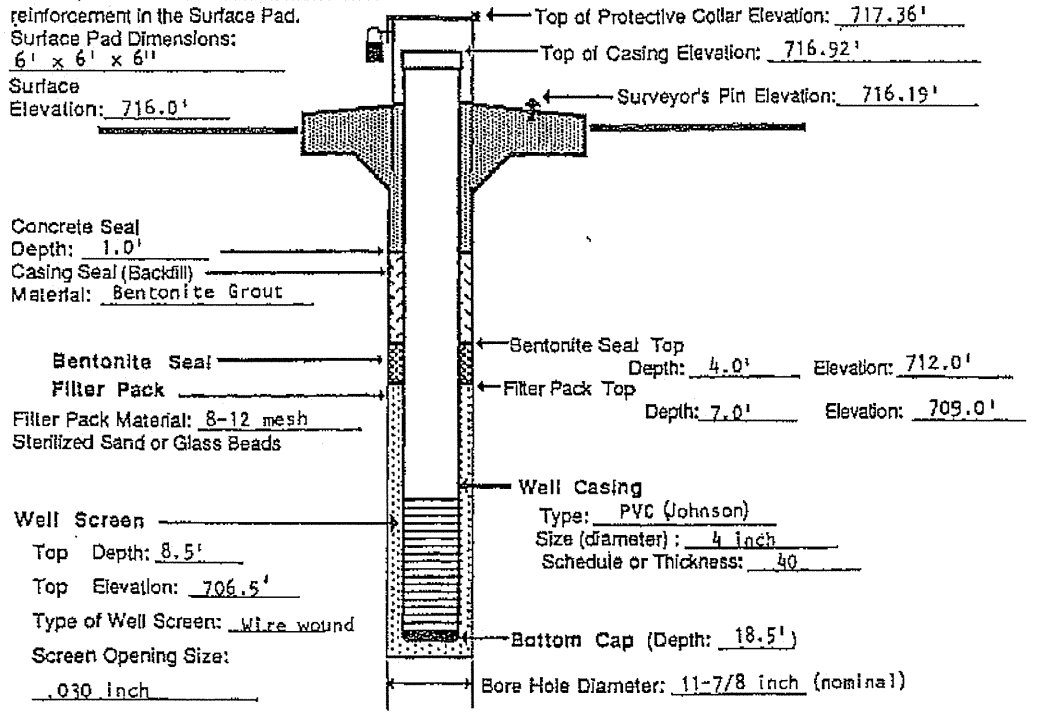
Static Water Level Elevation (with respect to MSL) after Well Developement : 709.52'

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel w/hinged top

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 716.0'



LOG OF MONITOR WELL NO. MW- 6

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 272.9 S 1330.7
Surface El.: 708.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lbs/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	U-1		SAND, tan, moist, loose										
			707.4										
	U-2		CLAY, w/sand, yellow, red & tan, gray, moist, mottled, w/iron oxide stains										
	U-3		- w/ironstone gravel @ 3.5 ft.										
	U-4		- wet @ 4.0 ft.										
			703.9										
5	C-5		CLAYEY SAND, red, tan & gray, moist, mottled, w/iron oxide stains, dense										
			700.2										
			SANDSTONE, reddish-brown & yellowish-brown, poorly to moderately cemented										
10													
15	C-6												
			- moderately to highly cemented @ 18.0 ft.										
			688.4										
20													
25													

Completion Depth: 20.0 ft.
Date Boring Started: 12/10/93
Date Boring Completed: 12/10/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled & sampled 11/29/93 & tremie grouted upon completion. Monitor well was constructed in separate boring (12/10/93).

TEMPLATE: PAMTALGT

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

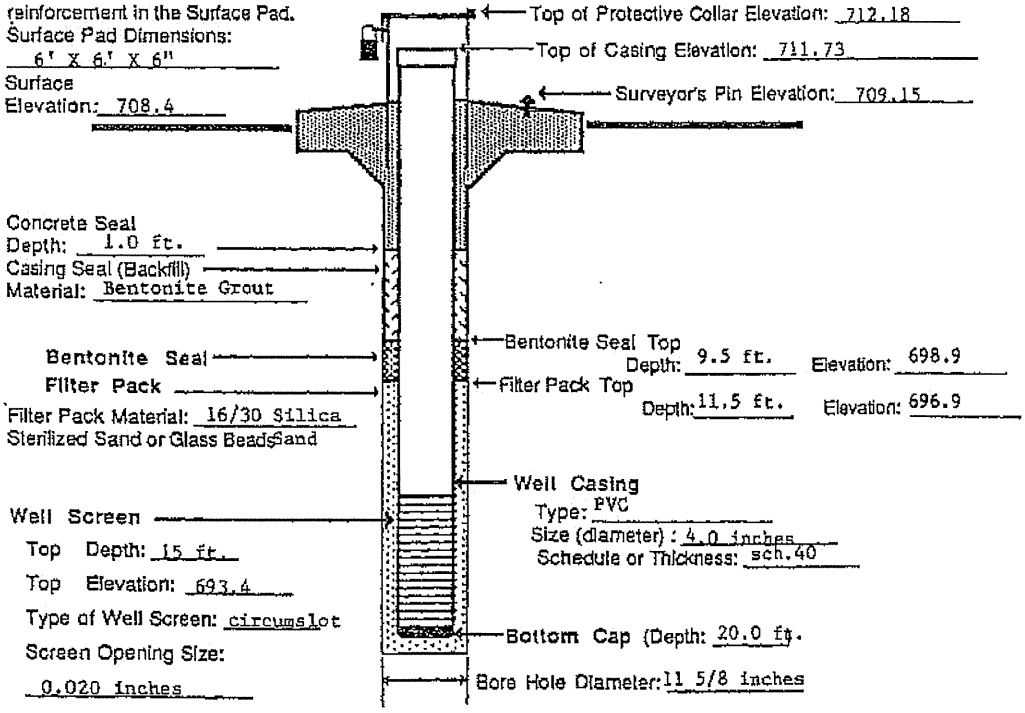
Permittee or Site Name: Johnson Co. Landfill
County: Johnson
Date of Monitor Well Installation: 12/10/93
Monitor Well: Latitude: N32°21'.7' Longitude: W97°12.14'
Monitor Well Groundwater
Gradient: Upgradient X Downgradient ____

TDH Permit No. : 1417B
Monitor Well I.D. No.: MW-6
Date of Monitor Well
Development: 2/1/94
Monitor Well Driller
Name: Donald James
License No.: 3257M

NOTE:
(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald James
Static Water Level Elevation (with respect to MSL) after Well Developement : 702.89ft.
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad lock
Type of Casing Protection: 6" by 6" steel casing
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' X 6' X 6"
Surface Elevation: 708.4



LOG OF MONITOR WELL NO. MW-7

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 262.1 S 1323.5
Surface El.: 708.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	U-1		SAND, tan, moist, loose										
			707.4										
			CLAY, w/sand, yellow, red & tan, gray, moist, mottled, w/iron oxide stains										
	U-2												
	U-3		- w/ironstone gravel @ 3.5 ft.										
	U-4		- wet @ 4.0 ft.										
			703.9										
5	C-5		CLAYEY SAND, red, tan & gray, moist, mottled, w/iron oxide stains, dense										
			700.2										
			SANDSTONE, reddish-brown & yellowish-brown, poorly to moderately cemented										
10													
15	C-6												
			- moderately to highly cemented @ 18.0 ft.										
20			- ironstone seam @ 20.4 ft.										
			687.7										
			SANDY CLAY, w/sand, gray, w/fine sand laminations (CL)						45	18	27	75	
25													

Completion Depth: 69.0 ft.
Date Boring Started: 12/16/93
Date Boring Completed: 12/20/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, tremie grouted 11/29/93 upon completion. Monitor well was constructed in a separate boring drilled 12/20/93.

Continued Next Page

EMPLATE: PAMPALGT

LOG OF MONITOR WELL NO. MW- 7

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 262.1 S 1323.5
Surface El.: 708.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	C-7		- sandstone seam @ 25.0 ft.										
			- w/ironstone seam @ 26.7 ft. 681.6										
			SHALE, clayey, gray, w/lignite, (CL)										
30													
35	C-8		- hard siltstone seam @ 35 ft.										
40													
			- sandstone seam (1/2") @ 43 ft.										
			- sandstone seam @ 44 ft.										
45	C-9												
			- sandstone seam @ 48 ft.										
50													

Completion Depth: 69.0 ft.
Date Boring Started: 12/16/93
Date Boring Completed: 12/20/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, tremie grouted 11/29/93 upon completion. Monitor well was constructed in a separate boring drilled 12/20/93.

Continued Next Page

LOG OF MONITOR WELL NO. MW- 7

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 262.1 S 1323.5
Surface El.: 708.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			- hard siltstone seam @ 51.5 ft.						46	18	28	74	
	C-10		- hard siltstone seams @ 54 ft.										
55			- hard siltstone seam @ 55 ft.										
			- hard siltstone seam @ 56 ft. - hard siltstone seams @ 56.5 ft.										
			- hard siltstone seam @ 57.5 ft. - hard siltstone seam @ 58 ft. 650.2										
			SANDSTONE, shaly, light gray & gray										
60			- siltstone seam @ 62 ft.										
	C-11		- siltstone seam @ 64.5 ft.										
65			- siltstone seam @ 65.2 ft.										
			640.7										
			SHALE, clayey, gray, w/sandstone partings (CL)						38	15	23	96	
			639.4										
70													
75													

TEMPLATE: PAMTALG

Completion Depth: 69.0 ft.
Date Boring Started: 12/16/93
Date Boring Completed: 12/20/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, tremie grouted 11/29/93 upon completion. Monitor well was constructed in a separate boring drilled 12/20/93.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

County: Johnson

Date of Monitor Well Installation: 12/20/93

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.4'

Monitor Well Groundwater

Gradient: Upgradient X Downgradient ____

TDH Permit No. : 1417B

Monitor Well I.D. No.: MW-7

Date of Monitor Well

Development: 2/14/94

Monitor Well Driller

Name: Donald James

License No.: 3257M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Mike Brown (EMCON Baker-Shiflett)

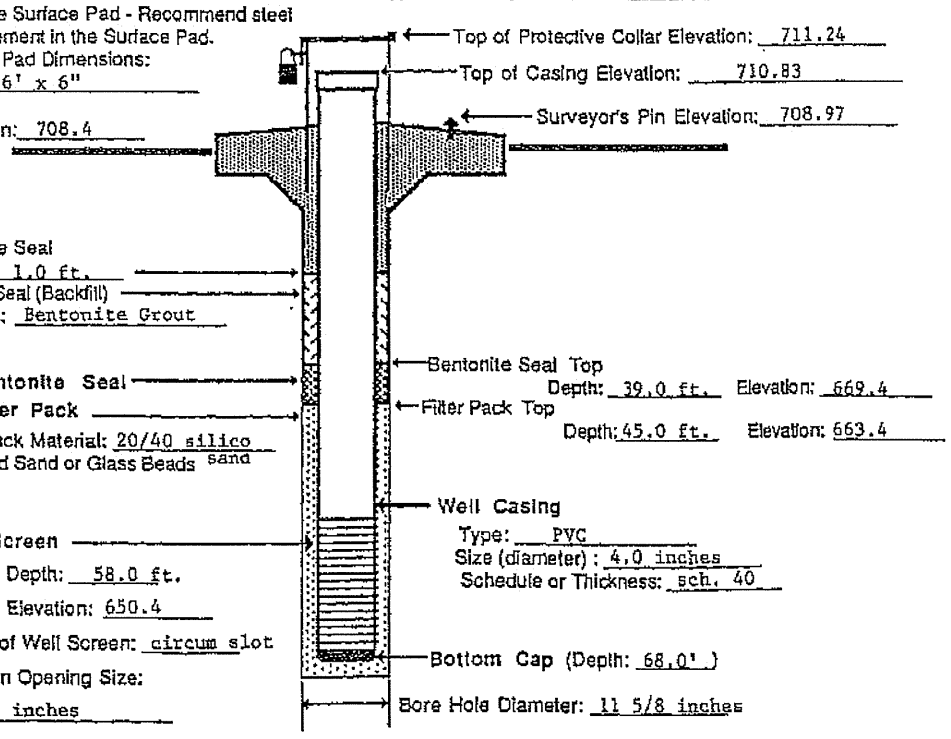
Static Water Level Elevation (with respect to MSL) after Well Development : 655.43 ft.

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Padlock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 708.4



LOG OF MONITOR WELL NO. MW- 8

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 698.9'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	SB-1		SANDY CLAY (CL), reddish brown, tan below 2 ft., hard to very stiff, dry, iron stained w/organics, some calcareous inclusions at 3 ft.		15	108	45	14	31	55	
3.5			SAND (SP-SM), w/some silt, dark reddish brown & tan, fine to medium-grained, loose to medium dense, moist, iron stained w/organics, slightly calcareous in upper 2 ft., sandstone seams to 5.5 ft., very moist below 5.5 ft. & saturated below 7.5 ft.								
5	SB-2		- sandstone layer from 7.5 ft. to 8.5 ft.								
	SB-3										
10	SB-4		- poorly cemented from 12 ft. to 12.5 ft. - sandstone layer from 12.5 to 13.5 ft. - highly iron stained w/ironstone at 14 ft. - dark brown below 15 ft.								
	SB-5										
15	SB-6				24					8	
19.0											
20											
25											
30											
35											
40											
45											
50											

Completion Depth: 19.0 ft.
Date Boring Started: 12/7/92
Date Boring Completed: 12/7/92
Engineer/Geologist: MB
Project No.: 5200-001-091

Remarks: Borehole augered to 19 ft; monitoring well installed to 18 ft.
Water level measured at 7.17 on 12-16-92.

EMCON BAKER-SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson Co. Landfill

County: Johnson

Date of Monitor Well Installation: 12-7-92

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'

Monitor Well Groundwater

Gradient: Upgradient ___ Downgradient X

TDH Permit No.: 1417B

Monitor Well I.D. No.: MW-8

Date of Monitor Well

Development: Dec. 17-18, 1992

Monitor Well Driller

Name: Nick Moericke

License No.: 02932M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Mike Brown (Baker-Shiflett/EMCON)

Static Water Level Elevation (with respect to MSL) after Well Developement: 694.21

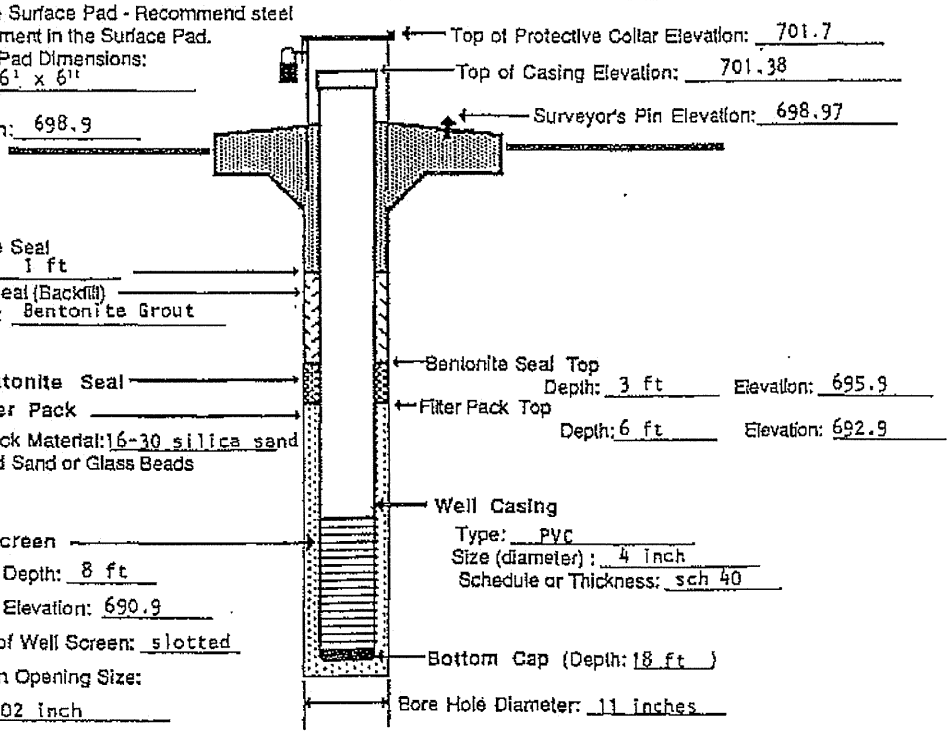
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"

Surface Elevation: 698.9



Top of Protective Collar Elevation: 701.7

Top of Casing Elevation: 701.38

Surveyor's Pin Elevation: 698.97

Concrete Seal
Depth: 1 ft
Casing Seal (Backfill)
Material: Bentonite Grout

Bentonite Seal

Filter Pack

Filter Pack Material: 16-30 silica sand
Sterilized Sand or Glass Beads

Bentonite Seal Top
Depth: 3 ft Elevation: 695.9

Filter Pack Top
Depth: 6 ft Elevation: 692.9

Well Casing
Type: PVC
Size (diameter): 4 inch
Schedule or Thickness: sch 40

Well Screen
Top Depth: 8 ft
Top Elevation: 690.9
Type of Well Screen: slotted
Screen Opening Size:
0.02 inch

Bottom Cap (Depth: 18 ft)

Bore Hole Diameter: 11 inches

LOG OF MONITOR WELL NO. MW- 9

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 699.1'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Wall Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
55	SB-13		- poorly cemented, wet sand layer from 51 ft. to 52 ft. w/siltstone seam at 52 ft.								
			52.0								
			SHALE w/sand & silt, gray, fissile, interbedded w/light gray, fine-grained sand								
	SB-14		- increase in sand & very moist below 55 ft.		16					95	
60	SB-15										
65	SB-16										
			- wet shaly sand w/poorly cemented siltstone & shale partings below 67 ft.								
			68.5		26					17	
70	SB-17		SAND w/silt (SP-SM), light gray, fine-grained, dense, poorly cemented, saturated w/some shale partings & siltstone seams								
			72.5								
			SHALE w/sand, dark gray & light gray, w/wet, moderately cemented sand seams & dense sand, fissile		19		29	14	15	75	
			74.0								
75											
80											
85											
90											
95											
100											

Completion Depth: 74.0 ft.
Date Boring Started: 12/9/92
Date Boring Completed: 12/10/92
Engineer/Geologist: DDM
Project No.: 5200-001-091

Remarks: Borehole augered to 74 ft; monitoring well installed to 74 ft.
Water level measured at 46.51 on 12-18-92.

The stratification lines represent approximate strata boundaries.

LOG OF MONITOR WELL NO. MW- 9

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 699.1'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	SB-1		SANDY CLAY (CL), reddish brown, tan below 2 ft., hard to very stiff, dry, iron stained w/organics, some calcareous inclusions at 3 ft.		15	108	45	14	31	55	
3.5			SAND (SP-SM), w/some silt, dark reddish brown & tan, fine to medium- grained, loose to medium dense, moist, iron stained w/organics, slightly calcareous in upper 2 ft., sandstone seams to 5.5 ft., very moist below 5.5 ft. & saturated below 7.5 ft.								
5	SB-2		- sandstone layer from 7.5 ft. to 8.5 ft.								
	SB-3										
10	SB-4										
	SB-5		- poorly cemented from 12 ft. to 12.5 ft.								
			- sandstone layer from 12.5 to 13.5 ft.								
15	SB-6		- highly iron stained w/ironstone at 14 ft.								
			- dark brown below 15 ft.		24					8	
20	SB-7										
23.0			SHALE w/sand, gray, very soft, moist, slightly fissile & blocky w/organic material, interbedded w/sand partings & seams		28		39	16	23	78	
25	SB-8										
29.0			SHALE w/trace of sand, dark grey, firm to very stiff, dry, fissile & blocky, some sand partings & seams		25		46	18	28	84	
30	SB-9										
			- siltstone seams from 33 ft. to 38.5 ft.								
35	SB-10		- reddish brown sand partings & seams below 35 ft.								
			- fossilferous at 38.5 ft.								
40	SB-11										
			- moist sand from 42 ft. to 42.5 ft.								
			- sand partings & seams w/lignite from 42.5 to 44 ft.								
45	SB-12		- silty sand layer w/shale partings & lignite from 44 ft. to 45 ft.		20		28	16	12	49	
46.0			SHALE, w/some sand, gray, stiff to hard, dry								
			- dark gray & very hard below 48 ft.								
50											

Completion Depth: 74.0 ft.
Date Boring Started: 12/9/92
Date Boring Completed: 12/10/92
Engineer/Geologist: DDM
Project No.: 5200-001-091

Remarks: Borehole augered to 74 ft; monitoring well installed to 74 ft.
Water level measured at 46.51 on 12-18-92.

Continued Next Page

The stratification lines represent approximate strata boundaries.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson Co. Landfill
County: Johnson
Date of Monitor Well Installation: 12-9-92
Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient X

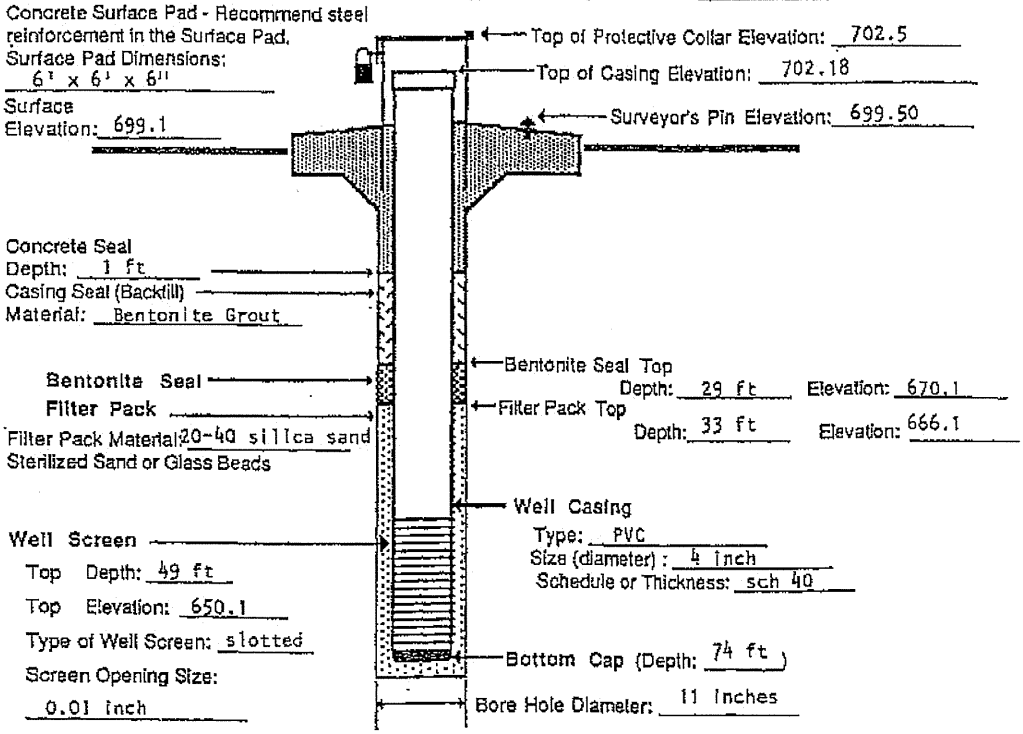
TDH Permit No.: 1417B
Monitor Well I.D. No.: MW-9
Date of Monitor Well
Development: Dec. 16-18, 1992
Monitor Well Driller
Name: Nick Moericke
License No.: 02932M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: DiAnn Mathis (Baker-Shiflett/EMCON)
Static Water Level Elevation (with respect to MSL) after Well Developement: 655.67
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 699.1



LOG OF MONITOR WELL NO. MW-10

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 997.3 S 787.2
Surface El.: 692.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	U-1		SAND, brown, moist, medium grain, organic										
	U-2		- tan, medium to fine grained below 3.0 ft. 688.7										
	U-3		CLAYEY SAND, tan, moist 687.7										
5	U-4		SANDY CLAY, tan-gray & red, moist, mottled, w/iron oxide stains, w/ironstone concretions.										
	U-5		685.2										
	U-6		SAND, very light gray, moist, indurated, fine to medium, w/lignite below 8.0 ft. 684.2										
	U-7		CLAYEY SAND, tan & yellow-red, moist, 683.4										
	U-8		mottled, w/iron oxide stains 683.0										
10	U-9		CLAY, w/sand, gray & yellow-red, moist, mottled, w/iron oxide stains, w/sand laminations										
	U-10		SAND, w/clay, tan & yellow-red, moist, mottled,										
	U-11		w/iron oxide stains, w/clay laminations, wet @										
	A-12		10.5 ft.										
	C-13												
15													
			674.2										
			SANDSTONE, yellow-red, moderately cemented 673.7										
			SHALY CLAY, w/sand, gray, moist, w/sand laminations (CL) 672.4						39	14	25	98	
20													
25													

Completion Depth: 20.0 ft.
Date Boring Started: 12/10/93
Date Boring Completed: 12/10/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and tremie grouted 11/29/93 upon completion. Monitor well wall constructed in a separate boring drilled 12/10/93.

TEMPLATE: PAMPALG

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

County: Johnson

Date of Monitor Well Installation: 12/10/93

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'

Monitor Well Groundwater

Gradient: Upgradient ___ Downgradient X

TDH Permit No. : 1417B

Monitor Well I.D. No.: MW-10

Date of Monitor Well Development: 1/19/94

Monitor Well Driller

Name: Donald D. James, C.P.G.

License No.: 3257M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report *All* Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald D. James, C.P.G.

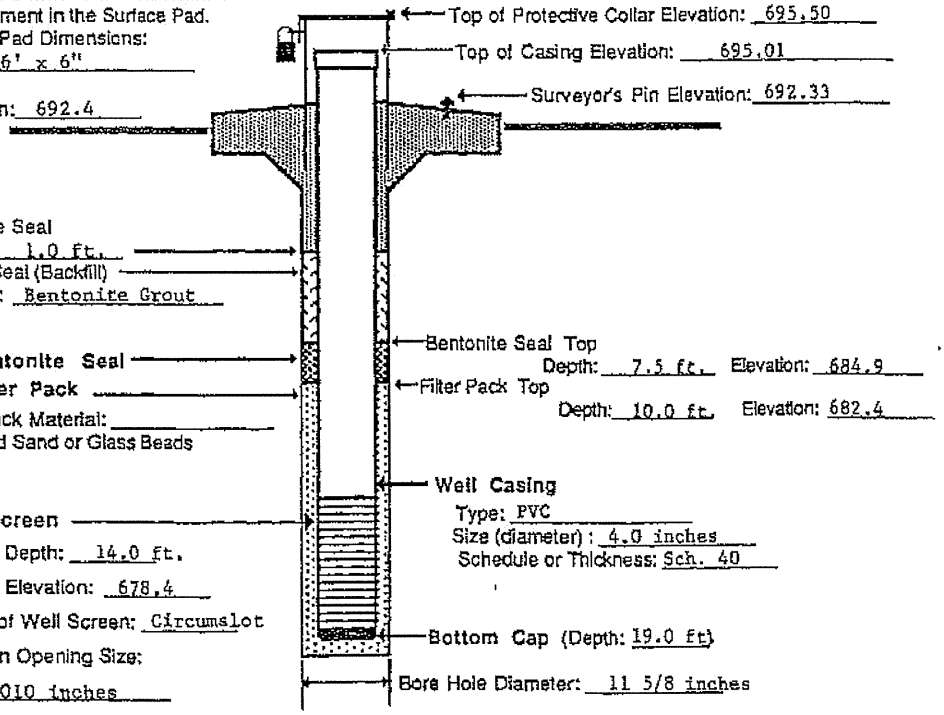
Static Water Level Elevation (with respect to MSL) after Well Developement : 683.03 ft.

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions:
6' x 6' x 6"
Surface Elevation: 692.4



← Top of Protective Collar Elevation: 695.50
← Top of Casing Elevation: 695.01
← Surveyor's Pin Elevation: 692.33

Concrete Seal
Depth: 1.0 ft.
Casing Seal (Backfill)
Material: Bentonite Grout

Bentonite Seal
Filter Pack

Filter Pack Material:
Sterilized Sand or Glass Beads

← Bentonite Seal Top
Depth: 7.5 ft. Elevation: 684.9
← Filter Pack Top
Depth: 10.0 ft. Elevation: 682.4

← **Well Casing**
Type: PVC
Size (diameter) : 4.0 inches
Schedule or Thickness: Sch. 40

Well Screen
Top Depth: 14.0 ft.
Top Elevation: 678.4
Type of Well Screen: Circumslot
Screen Opening Size:
0.010 inches

← Bottom Cap (Depth: 19.0 ft)

← Bore Hole Diameter: 11 5/8 inches

LOG OF MONITOR WELL NO. MW-11

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 1004.4 S 780.7
Surface El.: 691.2' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Elev.	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	U-1		SAND, brown, moist, medium grain, organic											
	U-2		- tan, medium to fine grained below 3.0 ft.	687.2										
	U-3		CLAYEY SAND, tan, moist	686.2										
5	U-4		SANDY CLAY, tan-gray & red, moist, mottled, w/iron oxide stains, w/ironstone concretions											
	U-5													
	U-6			683.7										
	U-7		SAND, very light gray, moist, indurated, fine to medium, w/lignite below 8.0 ft.											
	U-8			681.9										
	U-9		CLAY, w/sand, gray & yellow-red, moist, mottled, w/iron oxide stains, w/sand laminations	681.5										
10	U-10		SAND, w/clay, tan & yellow-red, moist, mottled, w/iron oxide stains, w/clay laminations, wet @ 10.5 ft.											
	U-11													
	A-12													
	C-13													
15				672.7										
			SANDSTONE, yellow-red, moderately cemented	672.2										
			SHALY CLAY, w/sand, gray, moist, w/sand laminations (CL)							39	14	25	98	
20	C-14			670.7										
			SHALE, clayey, gray, moist, w/sand partings											
			- hard siltstone seams @ 24.0 ft.											
25														

Completion Depth: 54.0 ft.
Date Boring Started: 12/27/93
Date Boring Completed: 12/27/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged 11/29/93 using tremie method. Monitor well was constructed in a separate boring drilled 12/27/94.

Continued Next Page

TEMPLATE: PAMPALGT

LOG OF MONITOR WELL NO. MW-11

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 1004.4 S 780.7
Surface El.: 691.2' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			- hard siltstone seams @ 27.0 ft., w/lignite below 27.0 ft.										
30	C-15		- hard siltstone seams @ 29.3 ft. - fossiliferous layer @ 29.5 ft. - hard, siltstone seams @ 30.0 ft. - brown-gray from 30.0 to 33.5 ft. - hard siltstone seams @ 31.7 ft.										
35			- w/slickensides below 35.5 ft.										
40	C-16		- w/lignite partings below 39.8 ft. 650.4 SANDSTONE, light brown & gray, medium grain, very gray - w/hard lignite seams @ 41.5 ft. - hard siltstone seams @ 44.0 ft. 646.9										
45	C-17		SHALE, sandy, gray & light gray, w/fine sand partings - hard siltstone seams @ 45.2 ft. - hard siltstone seams @ 47.0 ft. 642.0									88	
50			SANDSTONE, w/shale partings, tan-gray										

TEMPLATE: PAMPAL.GPJ

Completion Depth: 54.0 ft.
Date Boring Started: 12/27/93
Date Boring Completed: 12/27/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged 11/29/93 using tremie method. Monitor well was constructed in a separate boring drilled 12/27/94.

Continued Next Page

LOG OF MONITOR WELL NO. MW-11

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 1004.4 S 780.7
Surface El.: 691.2' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
												86	
			637.2										
55													
60													
65													
70													
75													

Completion Depth: 54.0 ft.
Date Boring Started: 12/27/93
Date Boring Completed: 12/27/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged 11/29/93 using tremie method. Monitor well was constructed in a separate boring drilled 12/27/94.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

County: Johnson

Date of Monitor Well Installation: 12/27/93

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'

Monitor Well Groundwater

Gradient: Upgradient X Downgradient ____

TDH Permit No.: 1417B

Monitor Well I.D. No.: MW-11

Date of Monitor Well

Development: 1/20/94

Monitor Well Driller

Name: Donald D. James, C.P.G.

License No.: 3257M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald D. James, C.P.G.

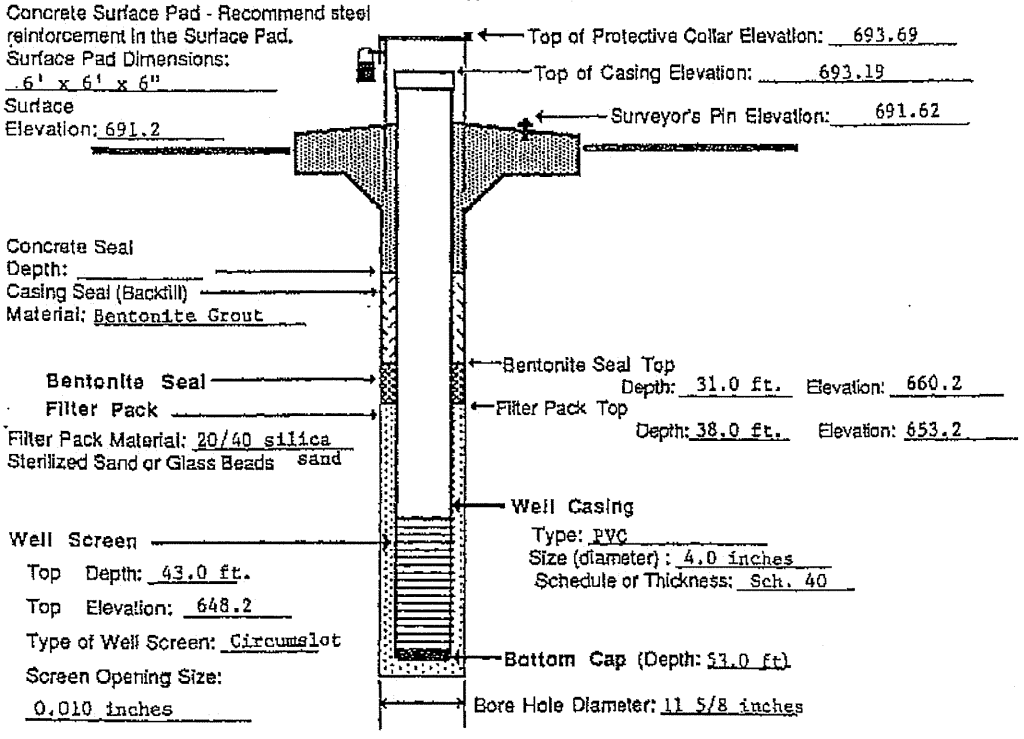
Static Water Level Elevation (with respect to MSL) after Well Developement: 654.19 ft.

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 691.2



LOG OF MONITOR WELL NO. MW-12

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 682.6'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	SB-1		SAND w/clay, brown, fine-grained, loose, slightly moist w/organics								
			- tan w/some iron staining below 3.5 ft.								
5	SB-2		6.0								
			CLAYEY SAND (SC), gray & reddish brown, soft, moist, highly iron stained w/ironstone & sandstone seams, well cemented sandstone layer from 7 ft. to 7.5 ft., sandy clay layer w/ironstone from 7.5 ft. to 8 ft., dense & poorly cemented below 8 ft. w/well cemented sandstone seams		18		23	15	8	21	
10	SB-3		10.0								
			SILTY SAND (SM) w/some clay, light gray & tan, fine-grained, poorly to moderately cemented, limonitic, saturated at 13 ft., sandstone seam at 16.5 ft., w/gray shaly sand below 16.5 ft.		16					55	
15	SB-4		16.0								
20											
25											
30											
35											
40											
45											
50											

Completion Depth: 16.0 ft.
Date Boring Started: 12/8/92
Date Boring Completed: 12/8/92
Engineer/Geologist: DDM
Project No.: 5200-001-091

Remarks: Borehole augered to 16 ft; monitoring well installed to 15.5 ft.
Water level measured at 9.89 ft on 12-28-92.

EMCON BAKER-SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson Co. Landfill

County: Johnson

Date of Monitor Well Installation: 12-8-92

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'

Monitor Well Groundwater

Gradient: Upgradient ___ Downgradient X

TDH Permit No. : 1417B

Monitor Well I.D. No.: MW-12

Date of Monitor Well

Development: Dec. 22-28, 1992

Monitor Well Driller

Name: Nick Moericke

License No.: 02932H

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: DiAnn Mathis (Baker-Shiflett/EMCON)

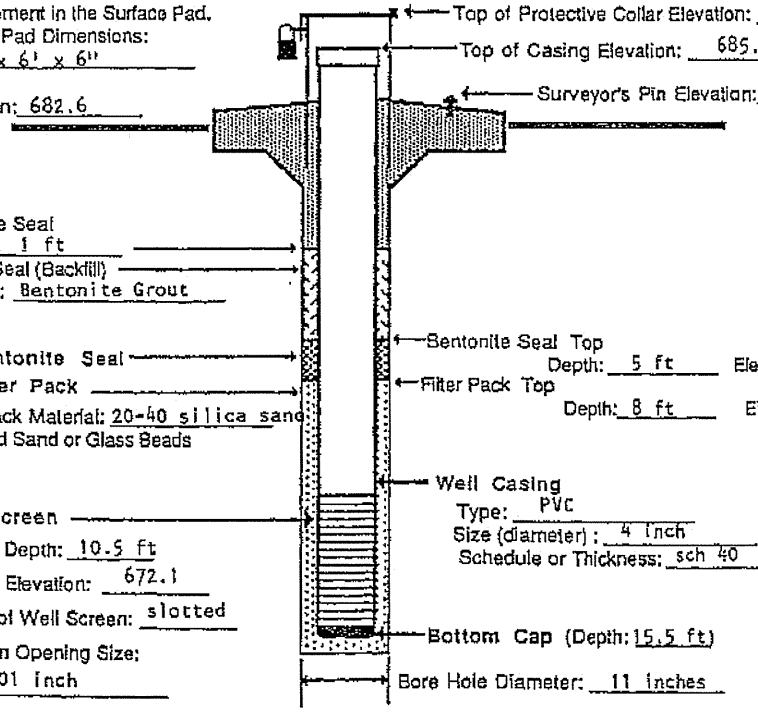
Static Water Level Elevation (with respect to MSL) after Well Developement : 675.72

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions:
6' x 6' x 6"
Surface Elevation: 682.6



Top of Protective Collar Elevation: 685.9

Top of Casing Elevation: 685.61

Surveyor's Pin Elevation: 683.33

Concrete Seal
Depth: 1 ft
Casing Seal (Backfill)
Material: Bentonite Grout

Bentonite Seal

Filter Pack

Filter Pack Material: 20-40 silica sand
Sterilized Sand or Glass Beads

Bentonite Seal Top
Depth: 5 ft Elevation: 677.6

Filter Pack Top
Depth: 8 ft Elevation: 674.6

Well Screen
Top Depth: 10.5 ft
Top Elevation: 672.1
Type of Well Screen: slotted
Screen Opening Size:
0.01 inch

Well Casing
Type: PVC
Size (diameter) : 4 inch
Schedule or Thickness: sch 40

Bottom Cap (Depth: 15.5 ft)

Bore Hole Diameter: 11 inches

LOG OF MONITOR WELL NO. MW-13

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 682.8'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	SB-1		SAND w/clay, brown, fine-grained, loose, slightly moist w/organics								
			- tan w/some iron staining below 3.5 ft.								
5	SB-2		6.0								
			CLAYEY SAND (SC), gray & reddish brown, soft, moist, highly iron stained w/ironstone & sandstone seams, well cemented sandstone layer from 7 ft. to 7.5 ft., sandy clay layer w/ironstone from 7.5 ft. to 8 ft., dense & poorly cemented below 8 ft. w/well cemented sandstone seams		18		23	15	8	21	
10	SB-3		10.0								
			SILTY SAND (SM) w/some clay, light gray & tan, fine-grained, poorly to moderately cemented, limonitic, saturated at 13 ft., sandstone seam at 16.5 ft., w/gray shaly sand below 16.5 ft.		16					55	
15	SB-4		17.5								
			SHALE w/sand, gray & light gray interbedded w/fine-grained sand		16		32	14	18	90	
20	SB-5		20.5								
			SHALE, w/trace of sand, dark gray w/light gray sand partings, soft to hard, moist, fissile w/siltstone seams to 24 ft.								
25	SB-6		- decrease in sand below 25 ft.		19		58	23	35	99	
30	SB-7		- very hard & fossiliferous below 29 ft.								
			-sandy shale from 30.5 ft. to 32.2 ft.								
35	SB-8				14		46	17	29	95	
			37.6								
			SILTY SAND (SM), light gray w/dark gray shale partings, fine-grained, medium dense & poorly cemented, wet		13					48	
40	SB-9		41.0								
			- interbedded sand, shale & lignite from 38.4 to 39.5 ft.		13					84	
			SHALE w/sand & silt, gray, soft & friable, moist, fissile, interbedded w/poorly to moderately cemented fine-grained sand w/siltstone seams to 47.5 ft.		14		27	14	13	83	
45	SB-10		48.0								
50											

Completion Depth: 48.0 ft.
Date Boring Started: 12/8/92
Date Boring Completed: 12/8/92
Engineer/Geologist: DDM
Project No.: 5200-001-091

Remarks: Borehole augered to 48 ft; monitoring well installed to 48 ft.
Water level measured at 37.60 on 12-24-92.

EMCON BAKER-SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

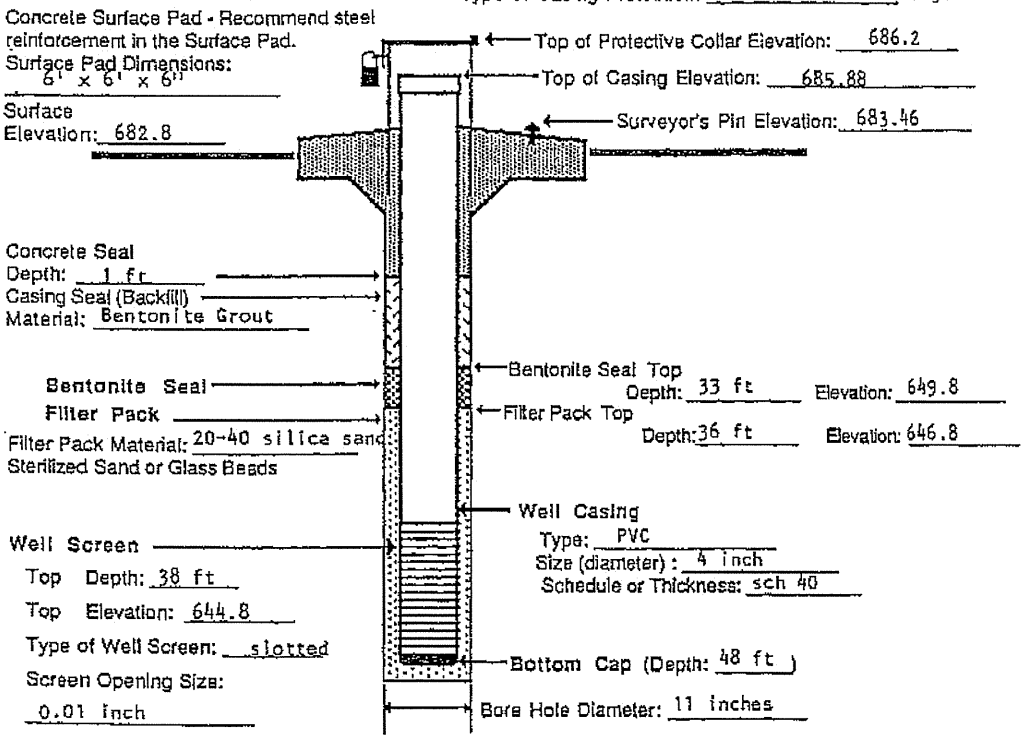
Permittee or Site Name: Johnson Co. Landfill
County: Johnson
Date of Monitor Well Installation: 12-8-92
Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14'
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient X

TDH Permit No.: 14178
Monitor Well I.D. No.: MW-13
Date of Monitor Well
Development: Dec. 22-24, 1992
Monitor Well Driller
Name: Nick Hoericke
License No.: 02932M

NOTE:
(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: DiAnn Mathis (Baker-Shiflett/EMCON)
Static Water Level Elevation (with respect to MSL) after Well Developement: 648.28
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" steel casing



LOG OF MONITOR WELL NO. MW-14

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 2560.0 S 577.1
Surface El.: 674.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	U-1		SAND, yellow-tan, moist, w/ironstone gravel, mottled, w/iron oxide stains, w/poorly cemented seams.										
	U-2												
	U-3												
5			668.9										
	U-4		SAND, w/clay, yellow-tan, tan & black, moist, w/lignite										
			666.9										
	U-5		CLAYEY SAND, yellow-tan & black, moist to wet, w/lignite										
10	U-6												
	U-7		- w/ironstone gravel @ 12.5 ft. - w/clay laminations & seams below 13.0 ft.										
			659.2										
15			SANDSTONE, red-brown, moderately cemented										
			657.7										
	C-8		SHALE, w/sand, gray, moist, w/sand partings (CL)						34	15	19	96	
			654.4										
20													
25													

Completion Depth: 20.0 ft.
Date Boring Started: 12/10/93
Date Boring Completed: 12/10/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged 11/24/93 using tremie method. Monitor well constructed in separate boring (12/10/93).

TMPLATE: PAMPALGI

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

TDH Permit No. : 1417B

County: Johnson

Monitor Well I.D. No.: MW-14

Date of Monitor Well Installation: 12/10/93

Date of Monitor Well Development: 2/14/94

Monitor Well: Latitude: N32°21.27 Longitude: W97°12.14

Monitor Well Driller Name: Donald D. James, C.P.G.

Monitor Well Groundwater Gradient: Upgradient ___ Downgradient X

License No.: 3257M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald D. James, C.P.G.

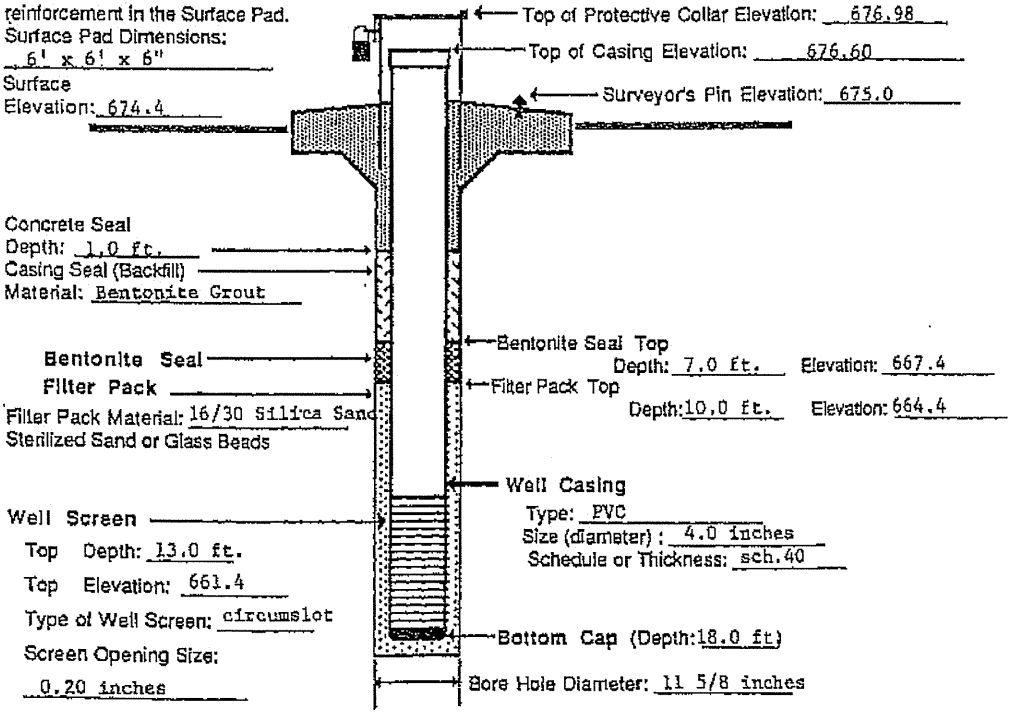
Static Water Level Elevation (with respect to MSL) after Well Development : 667.08 ft.

Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" x 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 674.4



LOG OF MONITOR WELL NO. MW-15

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 2559.2 S 565.1
Surface El.: 674.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
	U-1		SAND, yellow-tan, moist, w/ironstone gravel, mottled, w/iron oxide stains, w/poorly cemented seams.										
	U-2												
	U-3												
5			668.5										
	U-4		SAND, w/clay, yellow-tan, tan & black, moist, w/lignite										
			666.5										
	U-5		CLAYEY SAND, yellow-tan & black, moist to wet, w/lignite										
10	U-6												
	U-7		- w/ironstone gravel @ 12.5 ft. - w/clay laminations & seams below 13.0 ft.										
			658.8										
15			SANDSTONE, red-brown, moderately cemented										
			657.3										
	C-9		SHALE, w/sand, gray, moist, w/sand partings (CL)						34	15	19	96	
	C-10												
20			- w/lignite below 20.0 ft.										
			- fewer sand partings, clayey from 21.8 to 39.5 ft.										
25													

Completion Depth: 69.0 ft.
Date Boring Started: 12/14/93
Date Boring Completed: 12/15/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged, 11/24/93 using tremie method. Monitor well constructed in a separate boring drilled 12/15/93.

Continued Next Page

LOG OF MONITOR WELL NO. MW-15

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 2559.2 S 565.1
Surface El.: 674.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			- hard siltstone seam @ 27.0 ft.										
			- hard siltstone seam @ 29.0 ft.										
30	C-11		- hard siltstone seam @ 32.0 ft.										
			- hard siltstone seam @ 33.5 ft.										
35													
			- interlaminated w/sandstone partings below 39.0 ft.										
40	C-12												
45			- w/ hard siltstone seam @ 45.0 ft.										
			- w/hard siltstone seam @ 47.0 ft.										
	C-13												
50													

Completion Depth: 69.0 ft.
Date Boring Started: 12/14/93
Date Boring Completed: 12/15/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged, 11/24/93 using tremie method. Monitor well constructed in a separate boring drilled 12/15/93.

Continued Next Page

LOG OF MONITOR WELL NO. MW-15

Project Description: Johnson County Landfill Monitor Well Installation
Alvarado, Texas

Location: E 2559.2 S 565.1
Surface El.: 674.0' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
55			- hard siltstone seam @ 53.5 ft.						46	18	28	74	
			- w/hard siltstone seam @ 58.5 ft.										
60	C-14		- siltstone seams @ 62.0 ft. - sandy below 62.5 ft.										
	C-15		SANDSTONE, gray-tan, poorly-moderately cemented									14	
65			- w/clayey shale laminations below 65.5 ft.										
			606.5 SHALE, clayey, gray, w/siltstone seams (CH)						38	15	23	96	
70			605.0										
75													

Completion Depth: 69.0 ft.
Date Boring Started: 12/14/93
Date Boring Completed: 12/15/93
Engineer/Geologist: DDJ
Project No.: 5500-001-092

Remarks: Pilot boring drilled, sampled, and plugged, 11/24/93 using tremie method. Monitor well constructed in a separate boring drilled 12/15/93.

TEMPLATE: FAMPALIT

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

Permittee or Site Name: Johnson County Landfill

County: Johnson

Date of Monitor Well Installation: 12/14/93

Monitor Well: Latitude: N32°21.27' Longitude: W97°12.14

Monitor Well Groundwater

Gradient: Upgradient ___ Downgradient X

TDH Permit No. : 1417B

Monitor Well I.D. No.: MW-15

Date of Monitor Well

Development: 1/18/94

Monitor Well Driller

Name: Donald James

License No.: 3257M

NOTE:

(A)The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Donald James

Static Water Level Elevation (with respect to MSL) after Well Developement : 645.08 ft.

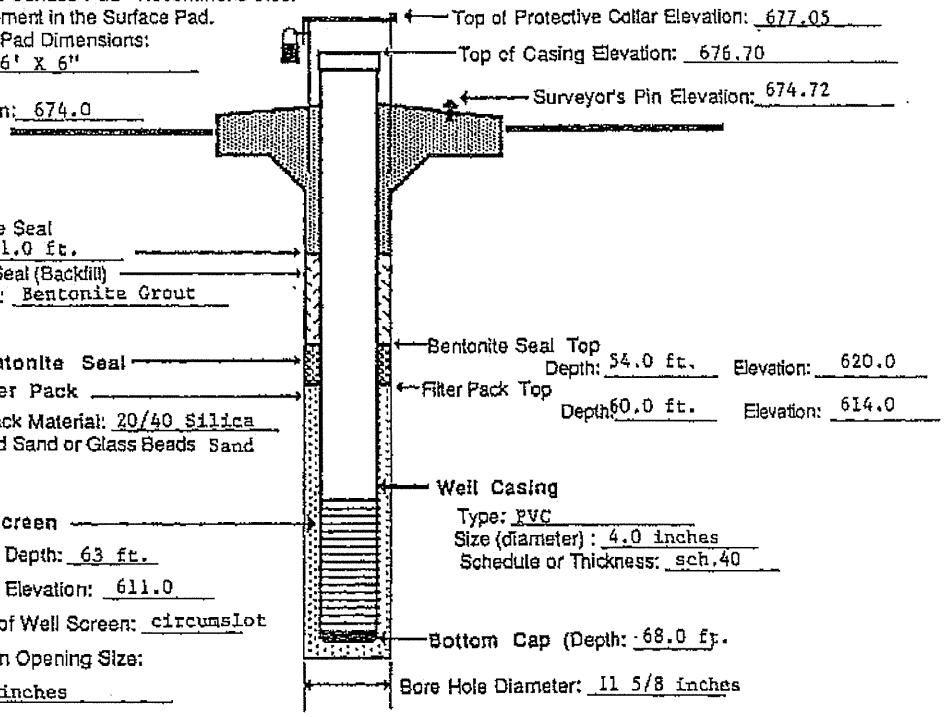
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock

Type of Casing Protection: 6" X 6" steel casing

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions:
6' X 6' X 6"

Surface Elevation: 674.0



Filter Pack Material: 20/40 Silica Sand
Sterilized Sand or Glass Beads

Type of Well Screen: circumslot

Screen Opening Size:
0.10 inches

LOG OF MONITOR WELL NO. MW-16

Project Description: JOHNSON COUNTY LANDFILL
Alvarado, Texas

Location: See Figure A.1
Surface El.: 685.9'

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Well Construction Detail	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	SB-1		SAND w/clay, dark brown to reddish brown, fine-grained, moist to 2.5 ft. & loose, dense below 3 ft. & poorly to moderately cemented, iron stained w/ironstone & organics								
4.0			SANDY CLAY (CL), reddish brown, tan & gray, hard, dry, iron stained with abundant ironstone, blocky below 5 ft., shaly clay w/sand from 6 ft. to 7 ft.		10		36	13	23	55	
5	SB-2										
7.0			SHALE, gray w/trace of reddish brown sand partings, hard to soft, dry, fissile & blocky w/organics, gypsum & calcareous partings, highly iron stained & limonitic w/abundant gypsum below 8 ft., very stiff & moist below 12.5 ft.		16		59	20	39	97	
10	SB-3										
13.5			SHALY SAND, tan & gray, fine-grained w/shale partings, moist, iron stained, very moist at 15 ft. w/poorly cemented sand								
15.3											
15	SB-4		SHALE w/sand, gray w/reddish brown & tan sand, soft, moist w/sand seams to 18.5 ft., iron staining to 18 ft., very stiff to hard & dark gray below 18 ft., wet shaly sand from 20 ft. to 21 ft., iron stained & poorly cemented w/lignite at 21 ft.		17		44	14	30	90	
21.0											
20	SB-5		SAND w/silt (SP-SM), tan to light brown, fine-grained, w/trace of clay, medium dense & poorly cemented, wet, slightly iron stained w/lignite, some shale partings w/increase in shale partings below 24 ft., saturated below 27 ft., light gray & moderately cemented below 32 ft.		21					13	
25	SB-6										
30	SB-7				22					18	
33.0											
35											
40											
45											
50											

Completion Depth: 33.0 ft.
Date Boring Started: 12/7/92
Date Boring Completed: 12/7/92
Engineer/Geologist: MB
Project No.: 5200-001-091

Remarks: Borehole augered to 33 ft; monitoring well installed to 32 ft.
Water level measured at 20.11 on 12-21-92.

EMCON BAKER-SHIFLETT, Inc.

The stratification lines represent approximate strata boundaries. In-situ, the transition may be gradual.

A. Monitor Well Data Sheet

Texas Department of Health
Division of Solid Waste Management
SE. 67 (3/1/89-B)

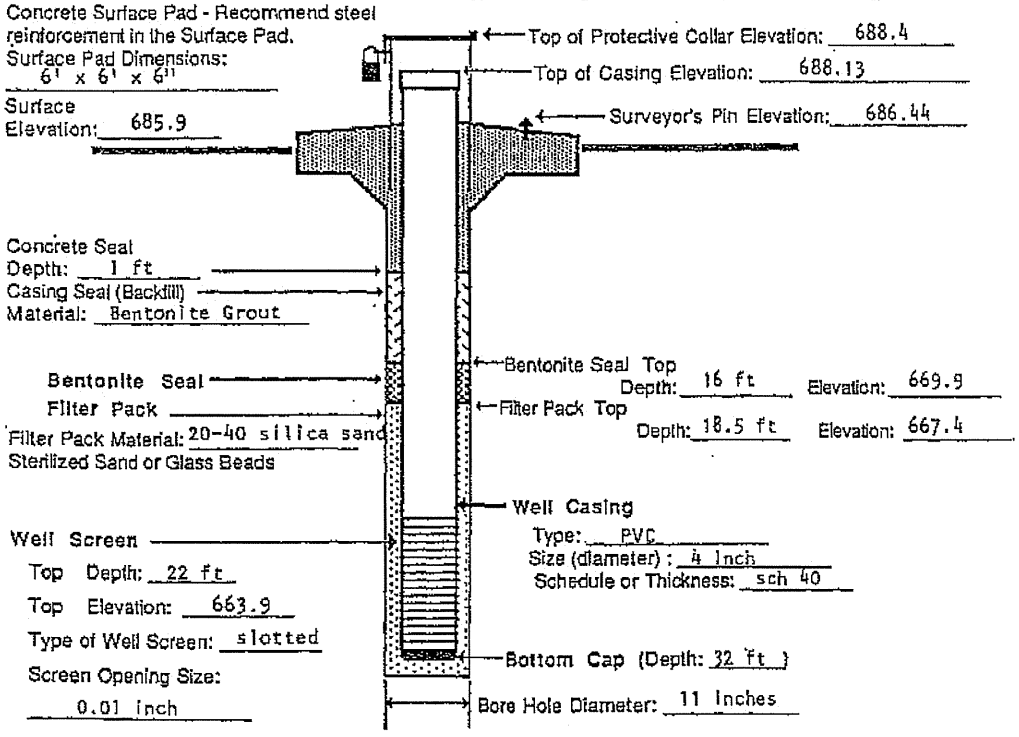
Permittee or Site Name: Johnson Co. Landfill
County: Johnson
Date of Monitor Well Installation: 12-7-92
Monitor Well: Latitude: N32°21.27' Longitude W97°12.14'
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient X

TDH Permit No.: 1417B
Monitor Well I.D. No.: MW-16
Date of Monitor Well
Development: 12-21-92
Monitor Well Driller
Name: Nick Hoericke
License No.: 02932M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Mike Brown (Baker-Shiflett/EMCON)
Static Water Level Elevation (with respect to MSL) after Well Development: 667.84
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" steel casing
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6' x 6' x 6"
Surface Elevation: 685.9



1994 CURA LANDFILL GAS PROBE BORING LOGS

CRA INC.
2726 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 630 - 787

RECORD OF SUBSURFACE EXPLORATION

Project No.: 11-84035	Well/Boring #: GW-1	Date Drilled: 01/27/94
Project: JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	Drilling Co.: GN ENTERPRISES	Drilling Method: CA
	Driller: DAVID	Logged By: C.D.H.

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS
0	Tan-red, fine sand, well sorted				Dry
2.5					
5.0			ST		
7.5	Tan-gray, silty clay, laminated				Dry
10.0			ST		
12.5					
15.0			ST		
17.5					
20.0	Gray, sandy clay, laminated		ST		Dry
22.5					
25.0	Gray-black, clay with sandy clay stringers, laminated		ST		Dry
27.5					
30.0	Tan-red, fine sand, well sorted		ST		Moist Saturated @ 30'
32.5	Gray, sandy clay				Saturated
35.0			ST		

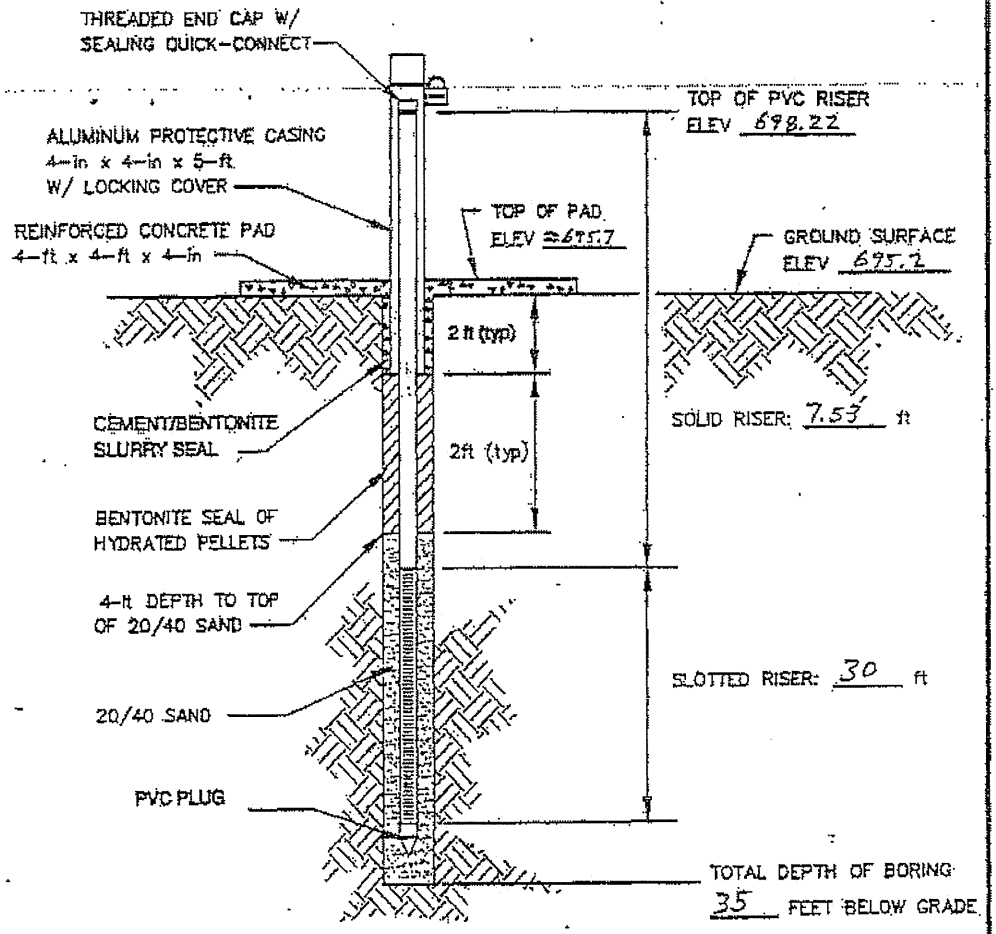
ABBREVIATIONS AND SYMBOLS

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Core
CT-5' - Continuous Sampler

Sample Submitted to Lab
WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

PF11-FRM\84035GW1.FRM



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
Mark R. Funkhouser 7-22-94

Subsurface details are as reported by Cura (See Appendix A-1)

BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates Houston, Texas

TITLE
GAS PROBE DETAIL
GW-1

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	R.P	REVIEWED	MAF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	943-4022	DWG NO.		FIGURE NO.	



CURA INC.
2755 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 620 - 7107

RECORD OF SUBSURFACE EXPLORATION

Project No.: 11-94035	Well/Boring #: GW-2	Date Drilled: 01/27/94	
Project: JOHNSON COUNTY LANDFILL, ALVARADO, TEXAS	Drilling Co.: GM ENTERPRISES	Drilling Method: CA	
	Driller: DAVID	Logged By: C.D.H.	

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS
0	Tan-red, clayey sand				Damp
2.5					
5.0	Tan-gray, sandy clay		ST		Damp
7.5					
10.0			ST		
12.5	Tan-gray, silty clay				Damp
15.0			ST		
17.5	Tan, sandy clay				Moist
20.0			ST		
22.5					
25.0			ST		Saturated @ 25'
27.5					
30.0					
32.5					
35.0					

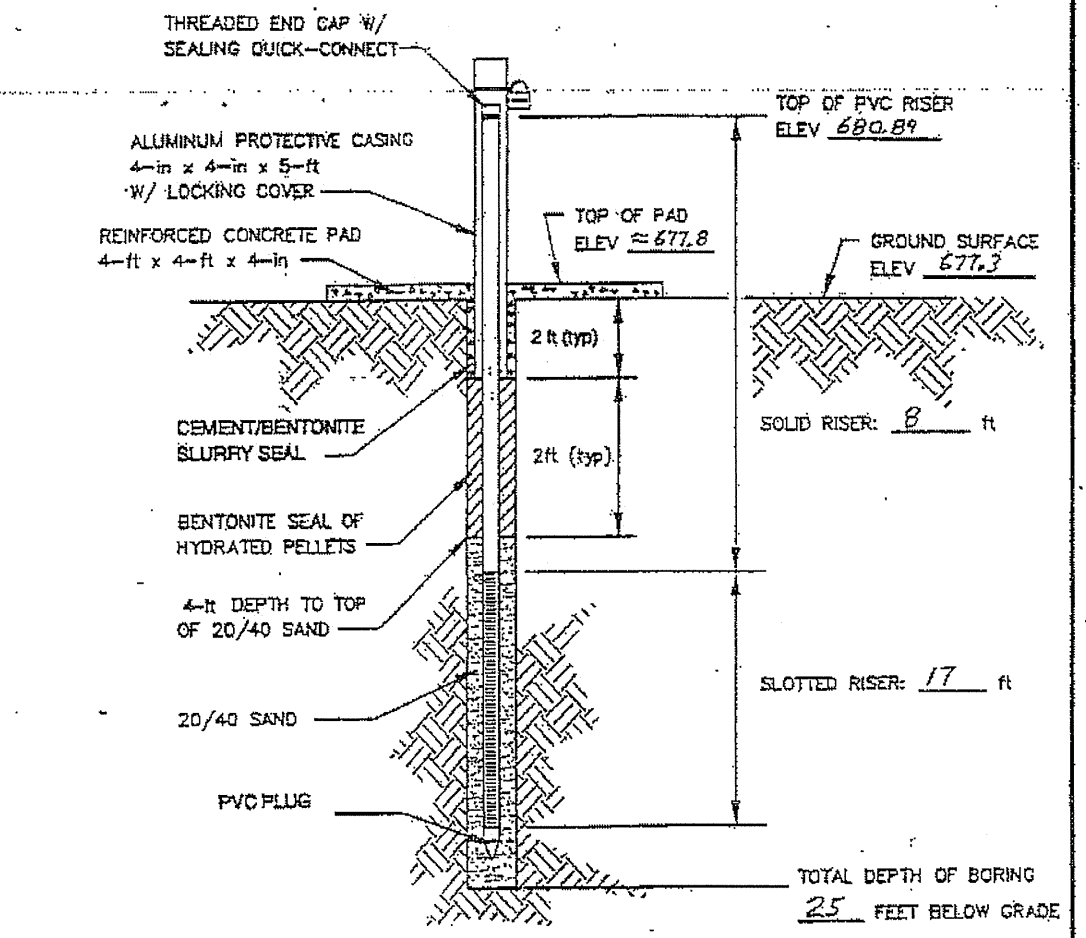
ABBREVIATIONS AND SYMBOLS

SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Cone
CT-5' - Continuous Sampler

Sample Submitted to Lab
WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

PF11-FRM\94035GW2.FRM



Subsurface details are as reported by Cura (See Appendix A-1)

STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
7-22-94

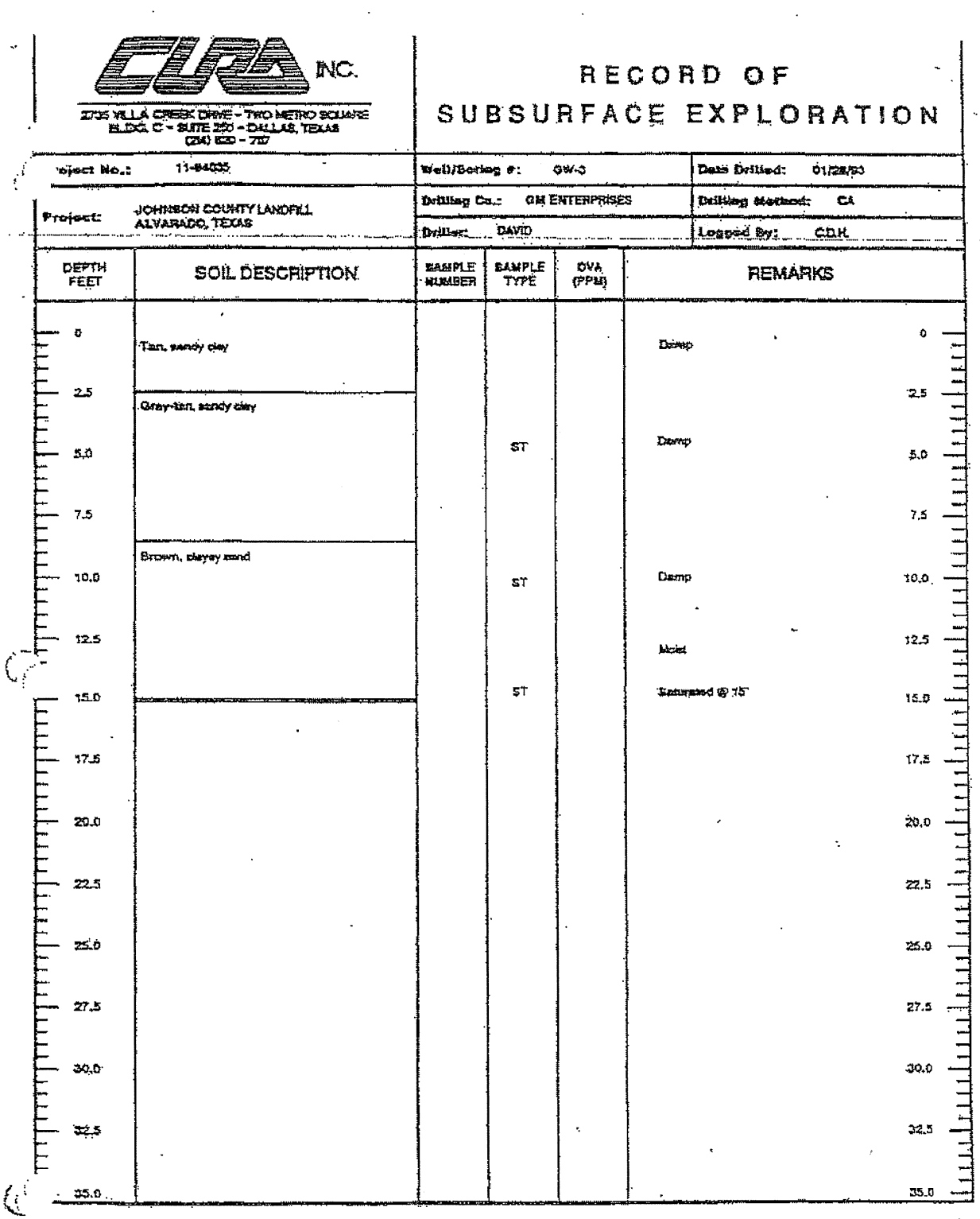
BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates

TITLE
GAS PROBE DETAIL
GW-2

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	B.P	REVIEWED	MJF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	943-4022	DWG NO.		FIGURE NO.	



CRA INC.

2726 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TEXAS
(214) 630 - 7101

RECORD OF SUBSURFACE EXPLORATION

Project No.: 11-84035	Well/Boring #: GW-3	Date Drilled: 01/28/93
Project: JOHNSON COUNTY LANDFILL ALVARADO, TEXAS	Drilling Co.: GM ENTERPRISES	Drilling Method: CA
	Driller: DAVID	Logged by: C.D.H.

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	REMARKS
0	Tan, sandy clay				Damp
2.5	Gray-tan, sandy clay		ST		Damp
5.0					
7.5	Brown, clayey sand		ST		Damp
10.0					
12.5			ST		Moist
15.0					Saturated @ 15'
17.5					
20.0					
22.5					
25.0					
27.5					
30.0					
32.5					
35.0					

ABBREVIATIONS AND SYMBOLS

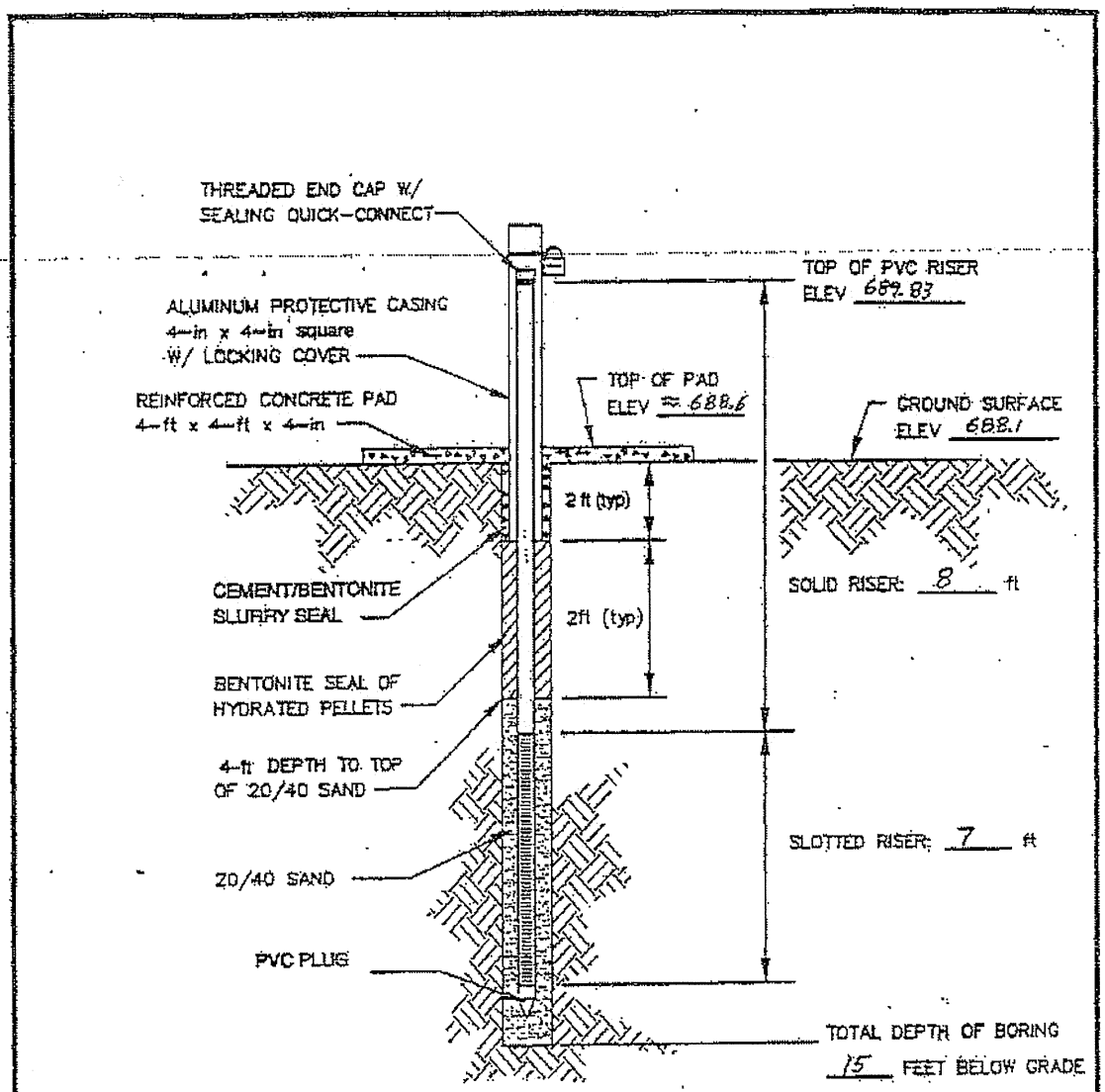
SS - Driven Split Spoon
ST - Pressed Shelby Tube
CA - Continuous Flight Auger
RC - Rock Core
THD - Texas Highway Department Core
CT-5' - Continuous Sampler

Sample Submitted to Lab

WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rock

HSA - Hollow Stem Augers
CFA - Continuous Flight Augers
DC - Driving Casing
MD - Mud Drilling

PF11-FRM\94035GW3.FRM



Subsurface details are as reported by Cura (See Appendix A-1)

STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 6 1/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Redmond, Texas

TITLE
GAS PROBE DETAIL
GW-3

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN dhg	CHECKED RJF	REVIEWED MRF	
DATE JUNE 1994	SCALE NONE	JOB NO. 943-4219	
FILE NO. 903-4022	DWG NO.	FIGURE NO.	

1994 GOLDER & ASSOCIATES
LANDFILL GAS PROBE BORING LOGS

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-4

BORING DATE: 6/25/94
BORING LOCATION: See Figure 1

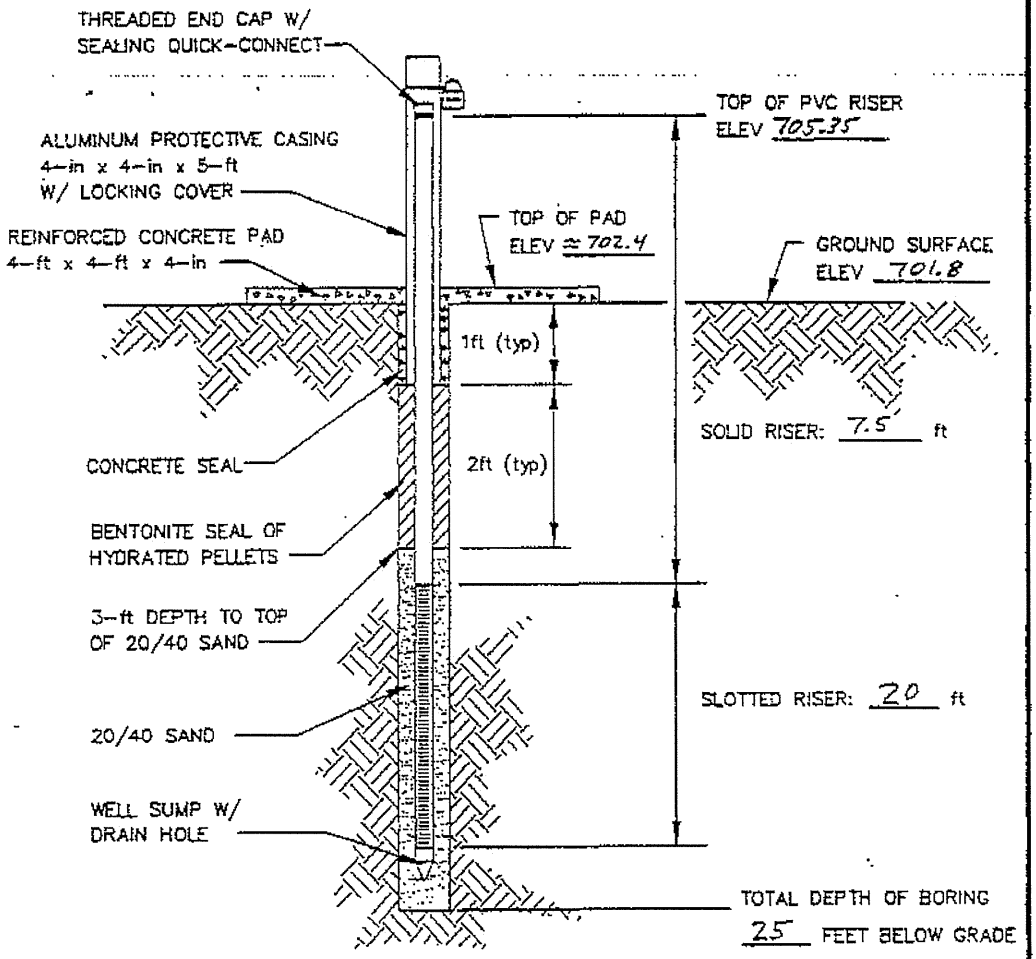
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Brown Sandy CLAY to Gray CLAY.										Concrete
		- with ferrous and lignitic stains and sand pockets to 10 ft.										Bentonite
5			CL/SC			1	3" ST	PUSH		24/24		
10						2	3" ST	PUSH		24/24		
		- gray below 15 ft.			14.00							20/40 Sand
15		- with silt partings at 15 ft.				3	3" ST	PUSH		24/24		
20		- damp at 20 ft.	CH			4	3" ST	PUSH		24/24		
		- hard and dry at 24 ft.				5	3" ST	PUSH		8/12	No water level detected, 1405, 6/25/94.	
25		Boring terminated at 25-ft-penetration.			25.00							
30												
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEI, Houston,TX
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

TITLE
GAS PROBE DETAIL
GW-4

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	R.P	REVIEWED	MF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-5

BORING DATE: 6/23/94
BORING LOCATION: See Figure 1

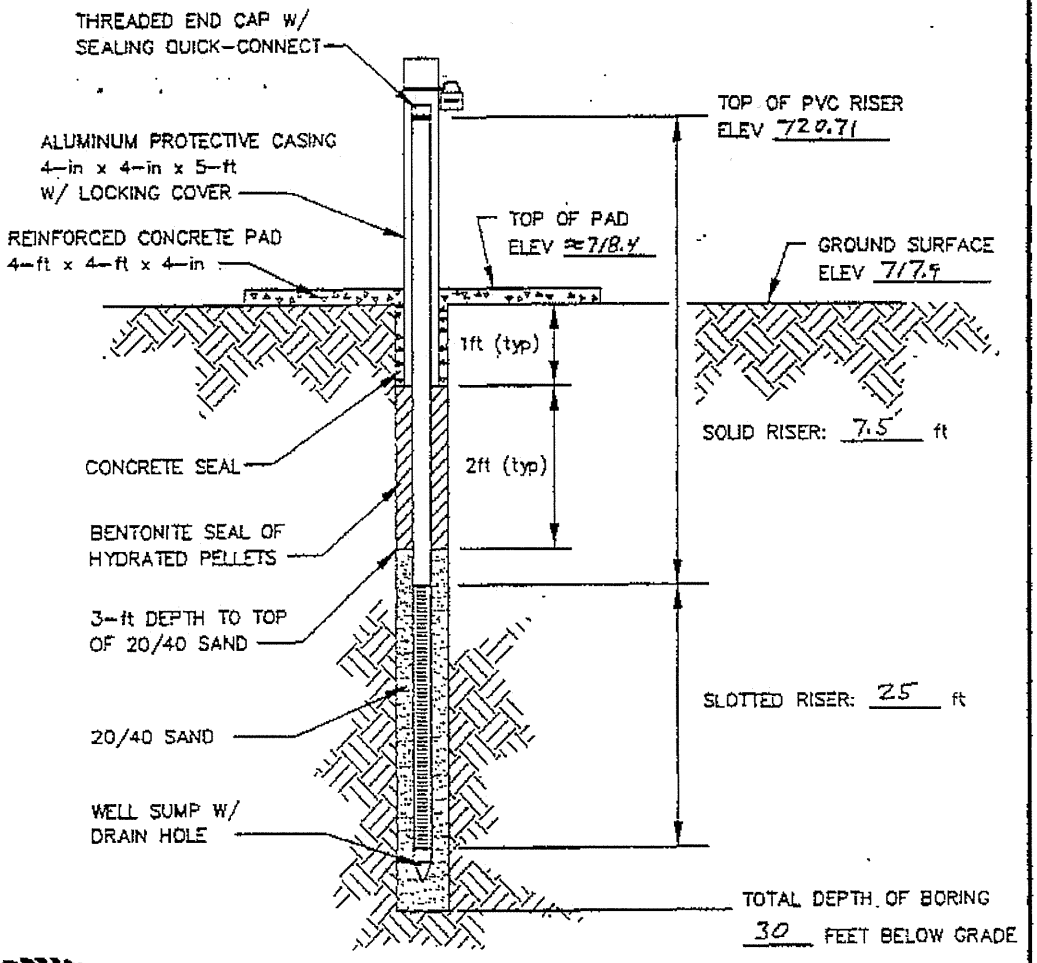
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Red Silty SAND.	SM									Concrete
		- sandy clay at 4 ft.	CL/SC			1	SS	8 - 14 - 17		18/18		Bentonite
5		Brown to gray CLAY with ferrous stains, partings, and nodules and sand pockets and partings.			5.00							
10			CL/CH			2	ST	PUSH		24/24		
15						3	ST	PUSH		24/24		20/40 Sand ▽ 1815 6/25/94
20		Brown fine SAND to Gray Silty SAND.	SP		19.00	4	ST	PUSH		12/24		
25			SM		24.00	5	SS	50 / 5"		11/11		
30		Grey CLAY with sand pockets, laminated.	CL/CH		29.00	6	SS	50 / 5"		11/11		
		Boring terminated at 30-ft-penetration.			30.00							
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEI, Houston, TX
DRILLER: Z. Roffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

TITLE
GAS PROBE DETAIL
GW-5

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	RJP	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 953-4262.1

RECORD OF BOREHOLE GW-5A

BORING DATE: 3/10/95

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Brown to grey CLAY, some red ferrous partings and little grey silty sand partings.	CL/CH									Concrete
5						1	3" ST	PUSH		24/24		Bentonite
		Dense, brown fine SAND and SILT, some red ferrous staining, few fine sand layers.	SP/SM		7.00							
10						2	3" ST	PUSH		24/24		
		Grey CLAY, trace of fine sand lenses.	CL/CH		11.00							
15						3	3" ST	PUSH		24/24		
												20/40 Sand
20						4	3" ST	PUSH		24/24		
25		Grey CLAY, some to and fine sand, trace med. to coarse gravel, saturated.				5	3" ST	PUSH		24/24		
30						6	3" ST	PUSH		24/24		
		Boring terminated at 30-ft.			30.00							
35												
40												

DRILL RIG: Failing F-6

DRILLING CONTRACTOR: A & F, Waxa., TX

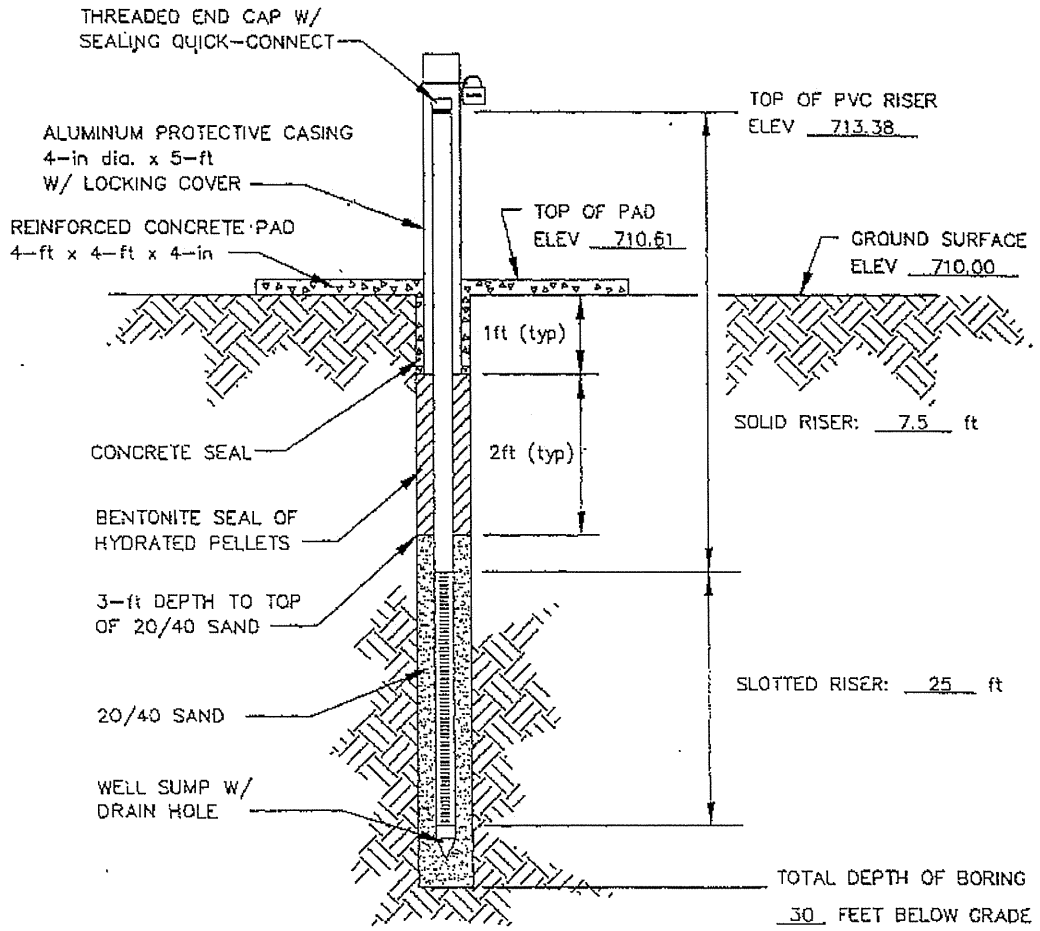
DRILLER: D. Foster

LOGGED: CDC

CHECKED: CDC

DATE: 3/10/95

Golder Associates



BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
TURKEY CREEK LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-5A

DRAWN dhg	CHECKED CDC	REVIEWED MRF	
DATE MARCH 1995	SCALE NONE	JOB NO. 953-4262	
FILE NO. 903-4022	DWG NO.	FIGURE NO. 2	

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-6

BORING DATE: 6/22/94
BORING LOCATION: See Figure 1

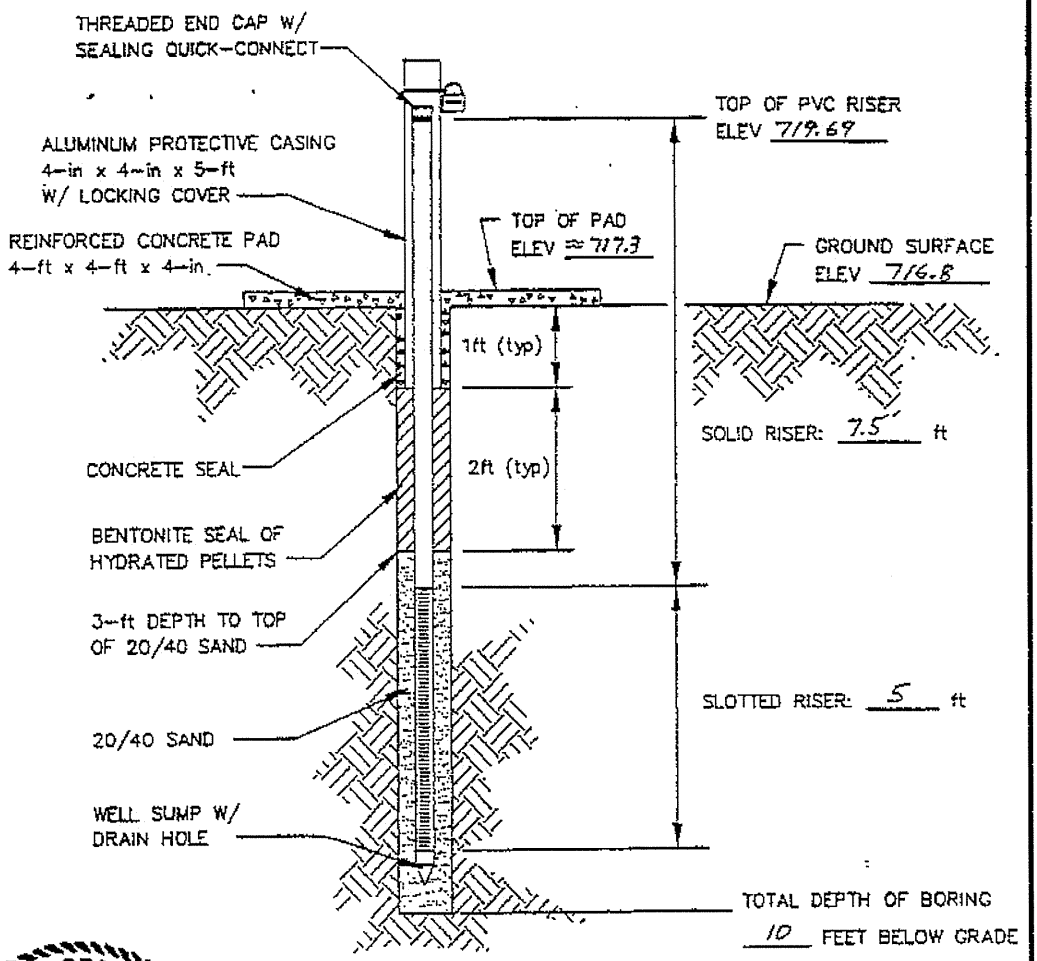
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25-ID Augers	Red Silty SAND.										Concrete
												Bentonite
5		- with brown clay pockets at 5 ft.	SM			1	ST	PUSH		12/24		▽ wet 1630 6/22/94
		- wet at 8 ft.										20/40 Sand
		- cemented below 9 ft.										
10					10.00	2	SS	11-16-19		18/18		
		Boring terminated at 10.5-ft-penetration.										
15												
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEI, Houston, TX
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
Mark R. Funkhouser
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-6

DRAWN	dhg	CHECKED	R.P	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-7

BORING DATE: 6/22/94
BORING LOCATION: See Figure 1

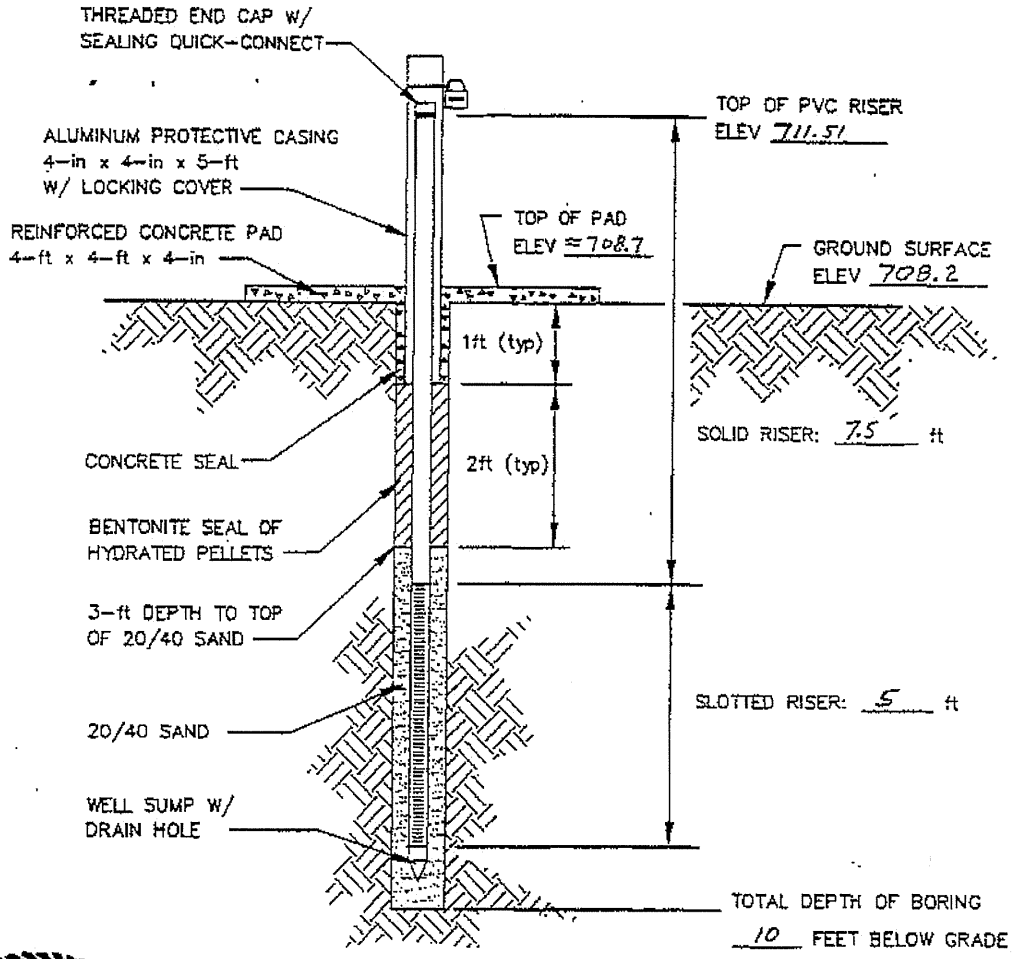
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Orange fine SAND.	SP									Concrete; Bentonite
5						1	SS	Ref / 6"		6/6		1840 6/25/94; 20/40 Sand
						2	SS	Ref / 4"		4/4		
10		Boring terminated at 10-ft-penetration.			10.00							
15												
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEL Houston,TX
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

TITLE
GAS PROBE DETAIL
GW-7

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	RJ	REVIEWED	MFF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4023	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-8

BORING DATE: 6/21/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Red and orange fine SAND.	SP									Concrete
												Bentonite
5		- damp at 4 ft.				1	SS	Ref / 6"		6/6		
		- wet at 8 ft.										1725 6/25/94
10						2	SS	Ref / 6"		6/6		20/40 Sand
15						3	SS	Ref / 6"		6/6		
						4	SS	Ref / 4"		4/4		
20		Boring terminated at 20-ft-penetration.			20.00							
25												
30												
35												
40												

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: AEI, Houston,TX

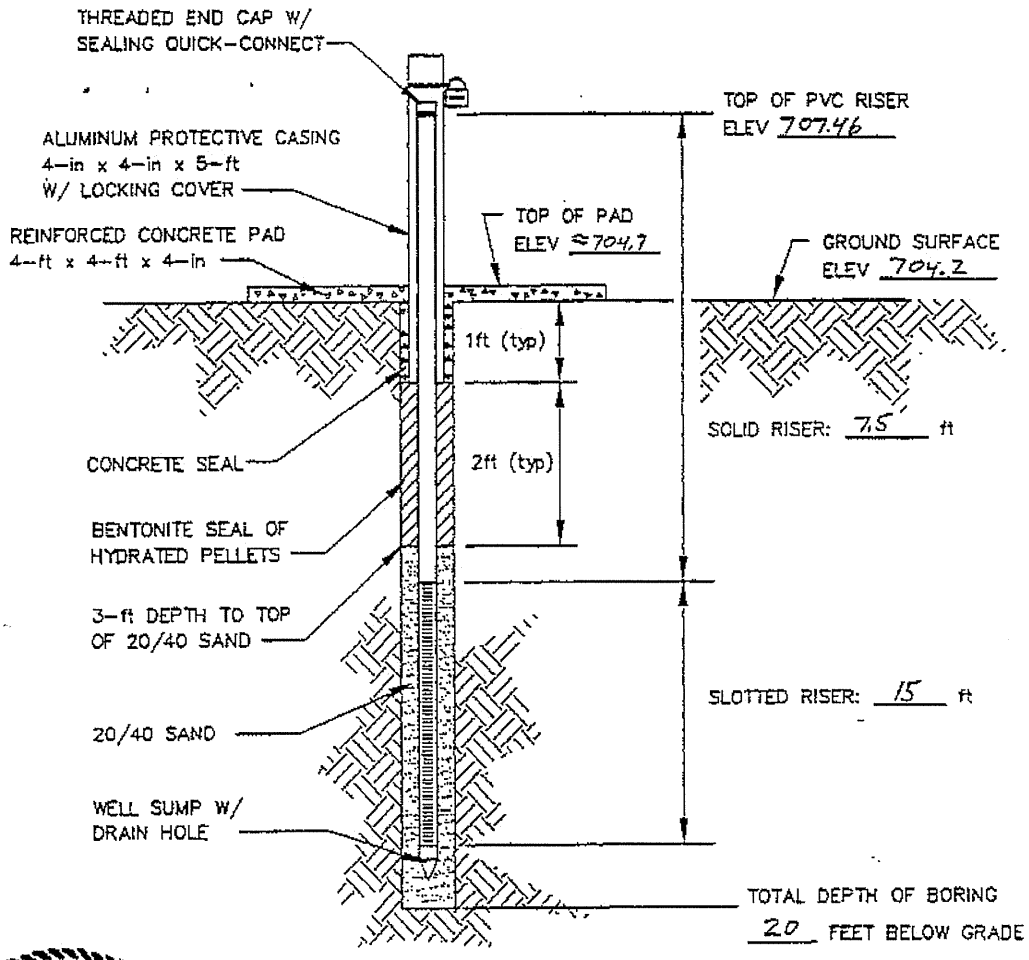
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP

CHECKED: RCP

DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER

Mark R Funkhouser 7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-8

DRAWN	dhg	CHECKED	R.P	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-9

BORING DATE: 6/23/94
BORING LOCATION: See Figure 1

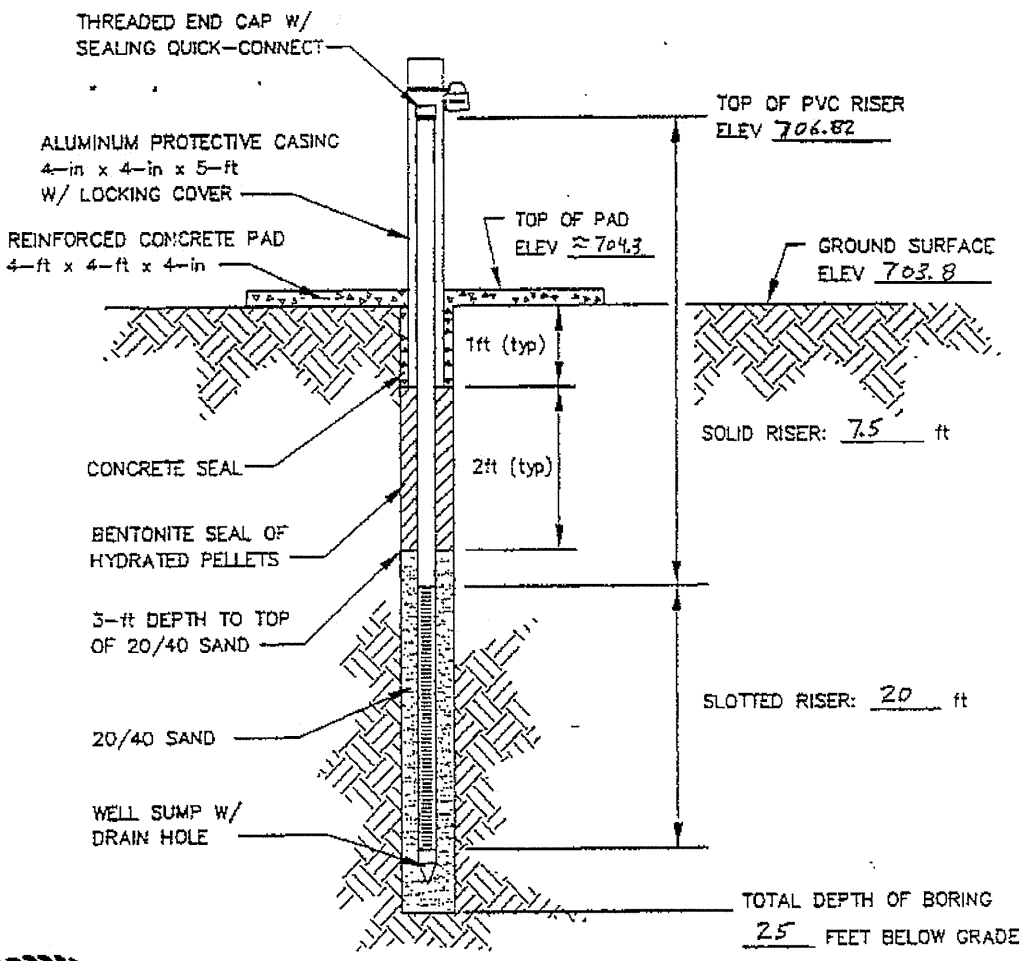
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Reddish brown fine SAND.	SP			1	SS	50 / 4"		10/10		Concrete; Bentonite
5												
10		- cemented at 9 ft. - orange below 9 ft.				2	SS	Ref / 4"		4/4		
15		- clamp at 14 ft.				3	SS	Ref / 4"		4/4		1740 6/25/94
20		- wet at 19 ft.				4	SS	50 / 3"		4/4		
25		Gray CLAY with sand pockets.	CL		24.00	5	SS	Ref / 3"		5/5		
		Boring terminated at 25-ft-penetration.			25.00							
30												
35												
40												
45												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: ASI, Houston, TX
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-9

DRAWN	dhg	CHECKED	RJP	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-10

BORING DATE: 6/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25"-ID Augers	Brown and orange fine SAND.	SM									Bentonite
		- silty to 2 ft.			2.00							
5		- clayey at 4 ft.				1	3" ST	PUSH		24/24		1440 6/22/94
		- wet at 7 ft.	SP									
10		- light grey and orange at 9 ft.				2	SS	50 / 6"		12/12		
		Boring terminated at 10-ft-penetration.			10.00							
15												
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: AEI, Houston,TX

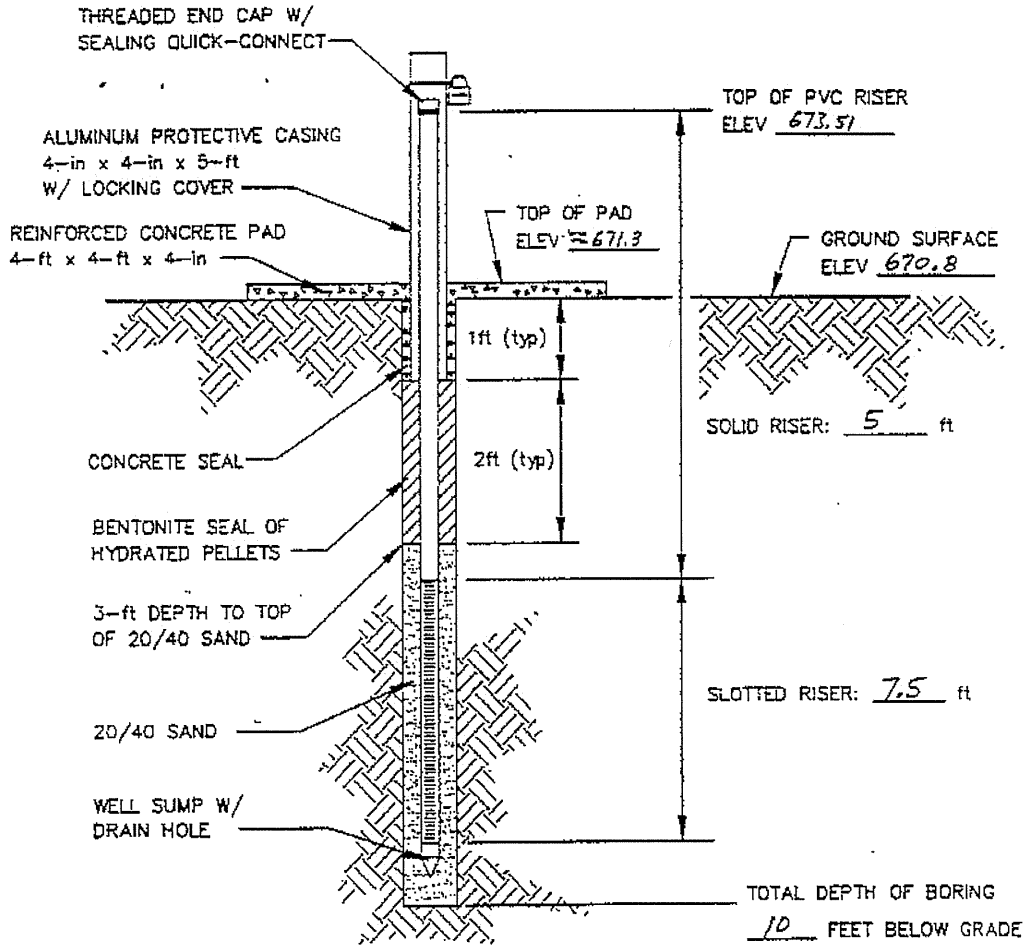
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP

CHECKED: RCP

DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER
4-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-10

DRAWN	dhg	CHECKED	RP	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	943-4222	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes
PROJECT LOCATION: Johnson County
PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-11

BORING DATE: 6/22/94
BORING LOCATION: See Figure 1

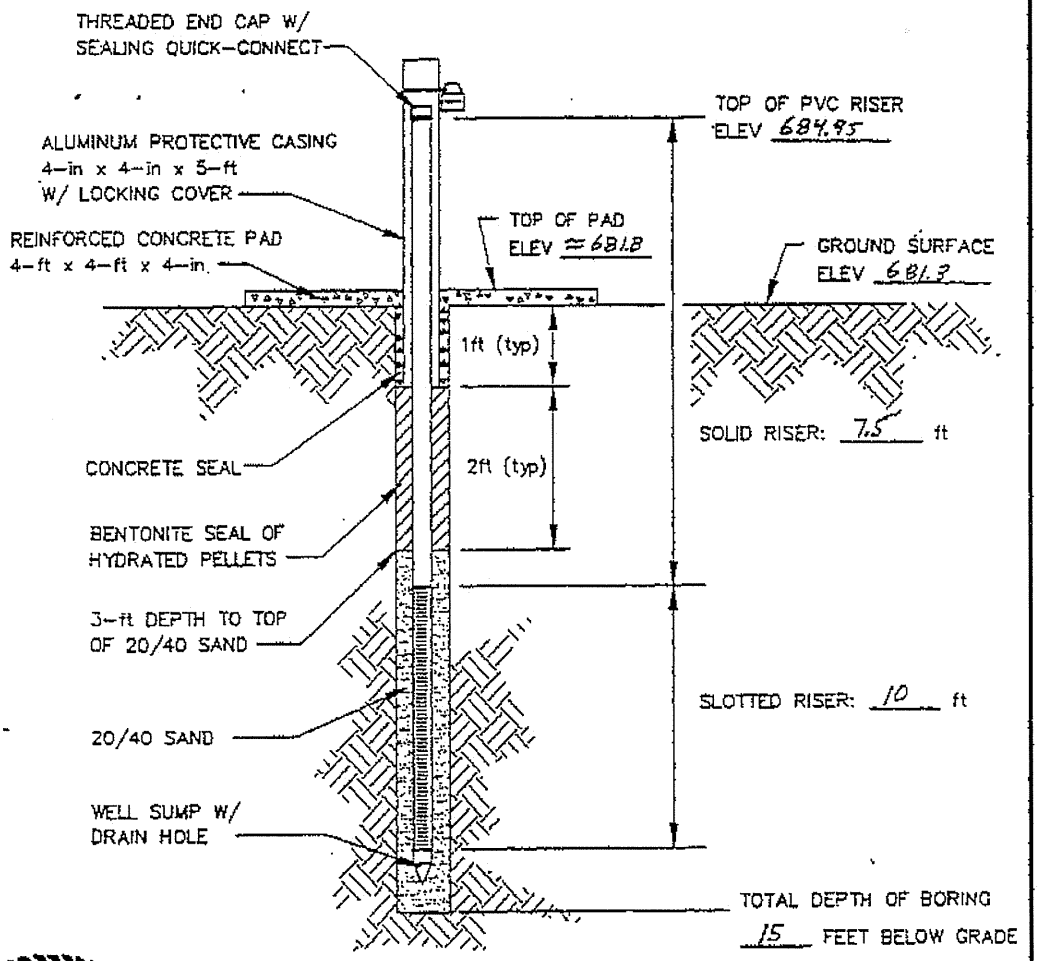
SHEET: 1 OF 1
DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25-ID Augers	Orange Silty SAND.	SM			1	SS	39-45		12/12		Concrete; Bentonite
5												
10		- damp at 9 ft. - light grey seam at 9.5 ft. - wet at 10 ft.				2	SS	11-15-19		18/18		20/40 Sand 1425 6/25/94
15		Grey CLAY with sand partings.	CL/CH		14.00	3	SS	17-23-41		18/18		
		Boring terminated at 15.5-ft-penetration.			15.50							
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61
DRILLING CONTRACTOR: AEI, Houston,TX
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP
CHECKED: RCP
DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED
PROFESSIONAL ENGINEER
Mark R. Funkhouser 7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates
Houston, Texas

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-11

DRAWN	dhg	CHECKED	RJP	REVIEWED	MF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4219.3

RECORD OF BOREHOLE GW-12

BORING DATE: 6/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH, FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: USCS	SOIL PROFILE: GRAPHIC LOG	SOIL PROFILE: ELEV / DEPTH	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS / 6 in	SAMPLES: H	SAMPLES: REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Brown CLAY with ferrous and lignitic stains and micaceous sand pockets.	CL/CH									Concrete
5						1	ST	PUSH		24/24		Bentonite
10		- with sand partings below 9 ft.				2	ST	PUSH		18/24		20/40 Sand
15						3	ST	PUSH		18/24		
20		- hard, grey, and with silt partings below 18 ft.				4	ST	PUSH		24/24		
		Boring terminated at 20-ft-penetration.			20.00						No water level detected, 1450, 6/25/94.	
25												
30												
35												
40												

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: ABI, Houston,TX

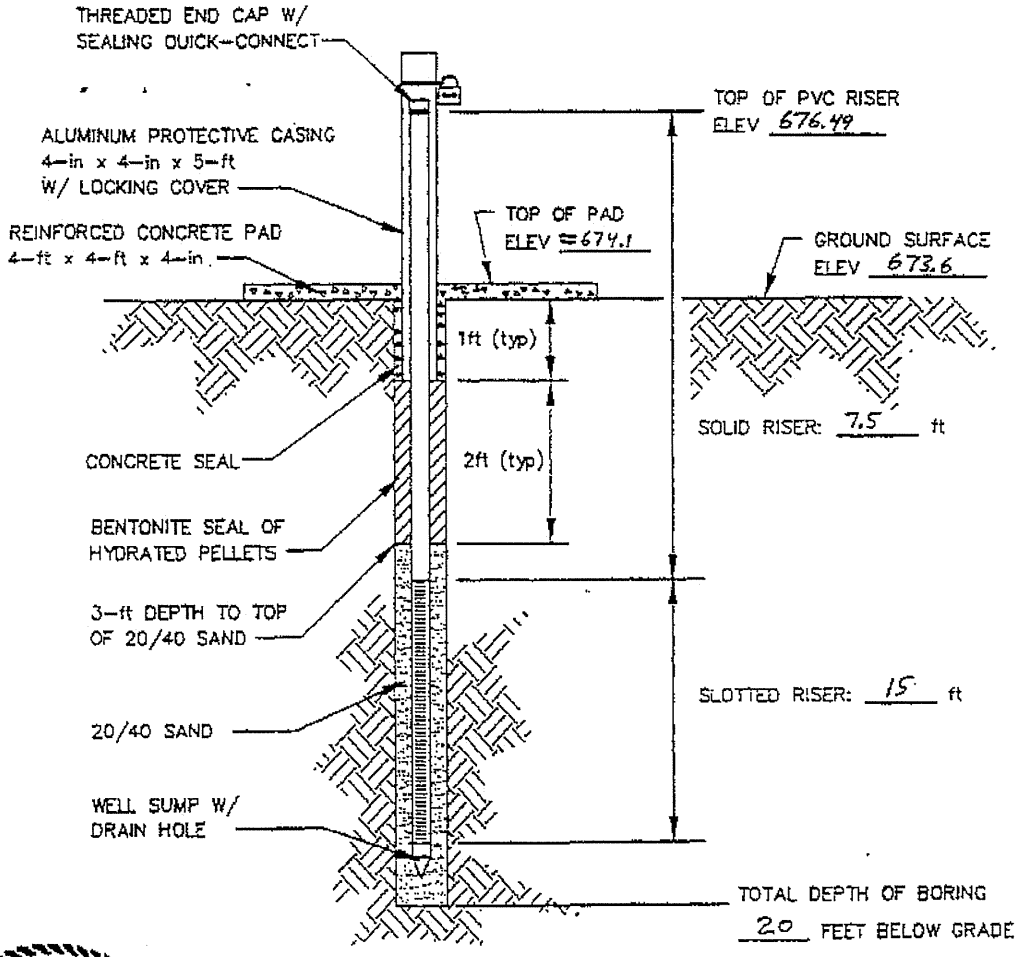
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP

CHECKED: RCP

DATE: 6/30/94



STATE OF TEXAS
MARK R. FUNKHOUSER
71712
REGISTERED PROFESSIONAL ENGINEER
7-22-94

BOREHOLE DIAMETER: 8 3/4 inches (nominal)
RISER DIAMETER: 2.0 inches (nominal)
SLOT SIZE: 0.010 inches

Golder Associates

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

TITLE
GAS PROBE DETAIL
GW-12

DRAWN	dhg	CHECKED	RJP	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	943-4022	DWG NO.		FIGURE NO.	

PROJECT: Gas Probes

PROJECT LOCATION: Johnson County

PROJECT NUMBER: 943-4215.3

RECORD OF BOREHOLE GW-13

BORING DATE: 5/22/94

BORING LOCATION: See Figure 1

SHEET: 1 OF 1

DATUM: Mean Sea Level

DEPTH SCALE FEET	BORING METHOD	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV / DEPTH	SAMPLES: NUMBER	TYPE	BLOWS / 6 in	N	REC/ATT	REMARKS	PIEZOMETER OR STANDPIPE INSTALLATION
0	4.25" ID Augers	Brown Sandy CLAY with ferrous, lignitic, and micaceous sand pockets.	CL									Concrete; Bentonite
5						1	3" ST	PUSH		18/24		20/40 Sand
		- hard drilling below 6 ft.										
		- hard, gray and brown, with fine to medium sand and ferrous nodules at 9 ft.				2	3" ST	PUSH		12/24		
10		Boring terminated at 10-ft-penetration.			10.00							
15												
20												
25												
30												
35												
40												

DRILL RIG: Mobile B-61

DRILLING CONTRACTOR: AEL Houston,TX

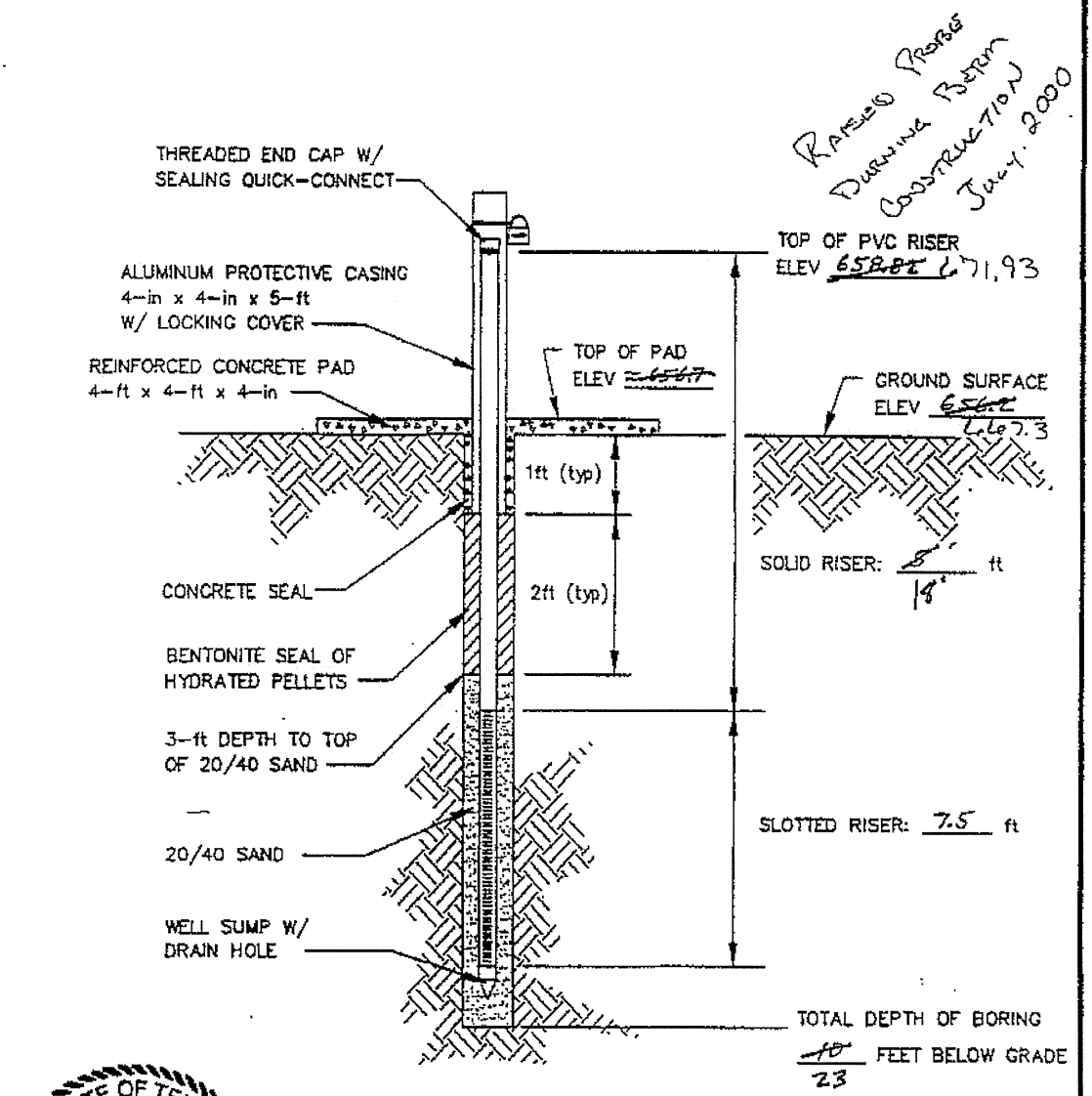
DRILLER: Z. Ruffin

Golder Associates

LOGGED: RCP

CHECKED: RCP

DATE: 6/30/94



Golder Associates Houston, Texas

TITLE

GAS PROBE DETAIL
GW-13

LAIDLAW WASTE SYSTEMS, INC.
JOHNSON COUNTY LANDFILL
ALVARADO, JOHNSON COUNTY, TEXAS

DRAWN	dhg	CHECKED	RP	REVIEWED	MRF
DATE	JUNE 1994	SCALE	NONE	JOB NO.	943-4219
FILE NO.	903-4022	DWG NO.		FIGURE NO.	

1995 EMCON

GROUNDWATER MONITOR WELL BORING LOGS

LOG OF MONITOR WELL NO. MW-17

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E -890.2 N -1274.4
Surface El.: 727.3' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		CLAYEY SAND, brown, moist, rootlets — 726.1		3.5								
			SANDY CLAY, brownish-red, very stiff, slightly moist, yellow-orange iron stains, occasional fine gravel & iron nodules — 722.8		4.0 3.5								
5	CS-2		SAND, yellowish-red to yellowish-tan, moist to wet, w/sandy clay seams, medium-grained, subround to angular, poorly graded, w/poorly cemented sandstone seams										
10	CS-3		- some free moisture below 9 ft. - increased yellow iron staining - reddish-yellow to yellow-tan -										
15	CS-4		- increasing moisture, increased fine sand & silt - wet below 13.5 ft.										
20	CS-5		- decreasing silt & fine sand - increased sandy clay seams below 21.5 ft. — 704.8										
25			SANDY CLAYEY SHALE, gray, very stiff, slightly moist, w/thin tan sand laminations, red & yellow iron stains & nodules at top — 703.8		4.0								
30													
35													
40													
45													
50													

Completion Depth: 21.5 ft.
Date Boring Started: 5/18/95
Date Boring Completed: 5/18/95
Engineer/Geologist: M. Brown
Project No.: 65500-011-870

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/5'screen set to 22.7'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

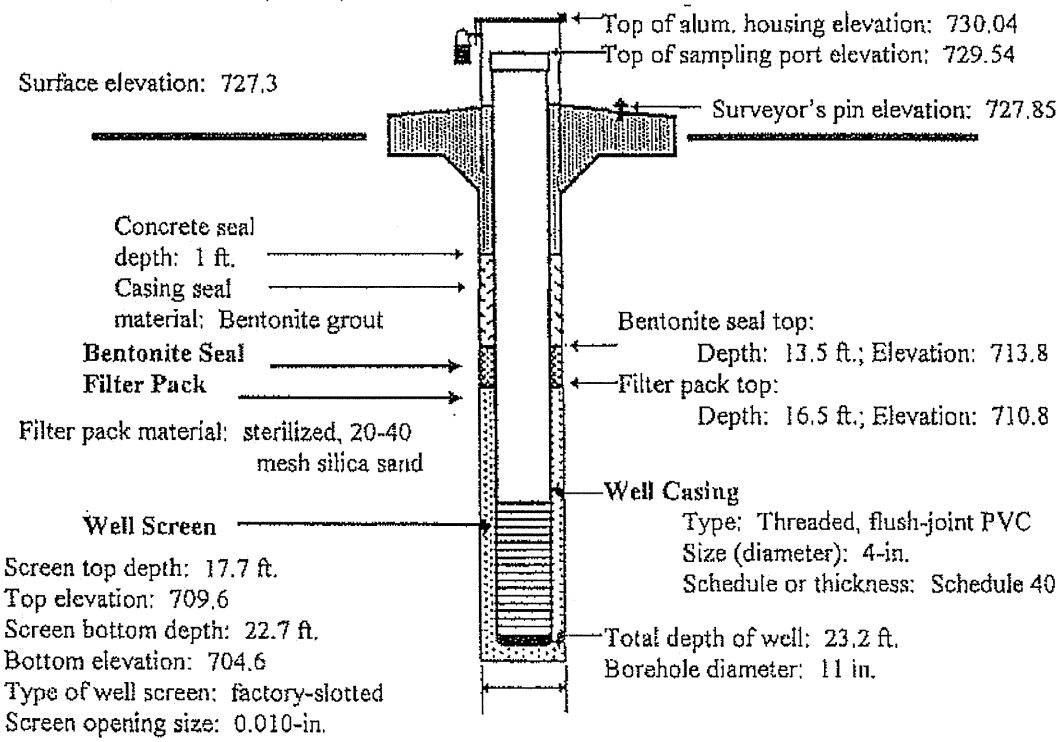
FIGURE A.2

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-17
Date of monitoring well installation: May 18, 1995
Date of monitoring well development: August 14, 1995
Well location: Latitude (or Northing): -1274.4 Longitude (or Easting): -890.2
Monitoring well groundwater gradient: Upgradient? Yes Downgradient?
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 715.32
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-18

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 356.6 N 202.0
Surface El.: 686.3' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION		Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lbs/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		SAND, brown, moist, w/occasional ironstone gravel, rootlets	685.8		1.5								
			SANDY CLAY, yellowish-red, moist, firm, w/poorly cemented sandstone seams, iron stains	683.3		2.5+								
5	CS-2		- moist silty sand layer @ 2.5 ft., fine to medium-grained, subangular	680.3		2.5								
			CLAY, w/sand, orange & gray, slightly moist, stiff, iron stains, light gray sand partings, roots			2.0								
	CS-3		- iron nodule seams @ 3.2 ft. & 4.2 ft.	677.8										
10			SANDY CLAY, w/silt, tan & gray, firm, slightly moist, orange iron stains, slightly shaly, roots			3.5								
			SHALY CLAY, olive gray, stiff, very slightly moist, w/sand partings, iron stains & nodules, carbonaceous, weathered, roots											
	CS-4		- jointed & blocky below 9.5 ft., slickensides, gypsum											
15			- iron nodule seam @ 11.5 ft., increasing gray	670.8										
			SANDY SHALE, tan & gray, slightly moist, w/tan sand seams & partings, iron stains, iron-cemented seams, noncohesive	668.8										
	CS-5					3.0								
20			SANDY SHALE, gray, slightly moist, stiff, w/light gray sand partings & seams, carbonaceous, pyrite	664.3										
	CS-6		- wet gray sand layer @ 17.5 ft., fine to medium-grained, subrounded											
25			SAND W/SHALE, tan, w/gray, iron stained sandy shale seams & layers, medium-grained, subangular, poorly cemented											
	CS-7		- clean tan sand layer @ 23.5 to 24.5 ft., wet											
30			- sandy shale layer @ 25.5 ft.	656.8										
			- very hard iron cemented sandstone layer @ 29 ft.											
	U-8		SANDY SHALE, gray, slightly moist, stiff, w/gray sand seams & partings, carbonaceous	652.3		3.0								
35														
40														
45														
50														

Completion Depth:	34.0 ft.
Date Boring Started:	5/22/95
Date Boring Completed:	5/22/95
Engineer/Geologist:	M. Brown
Project No.:	65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 33.5'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

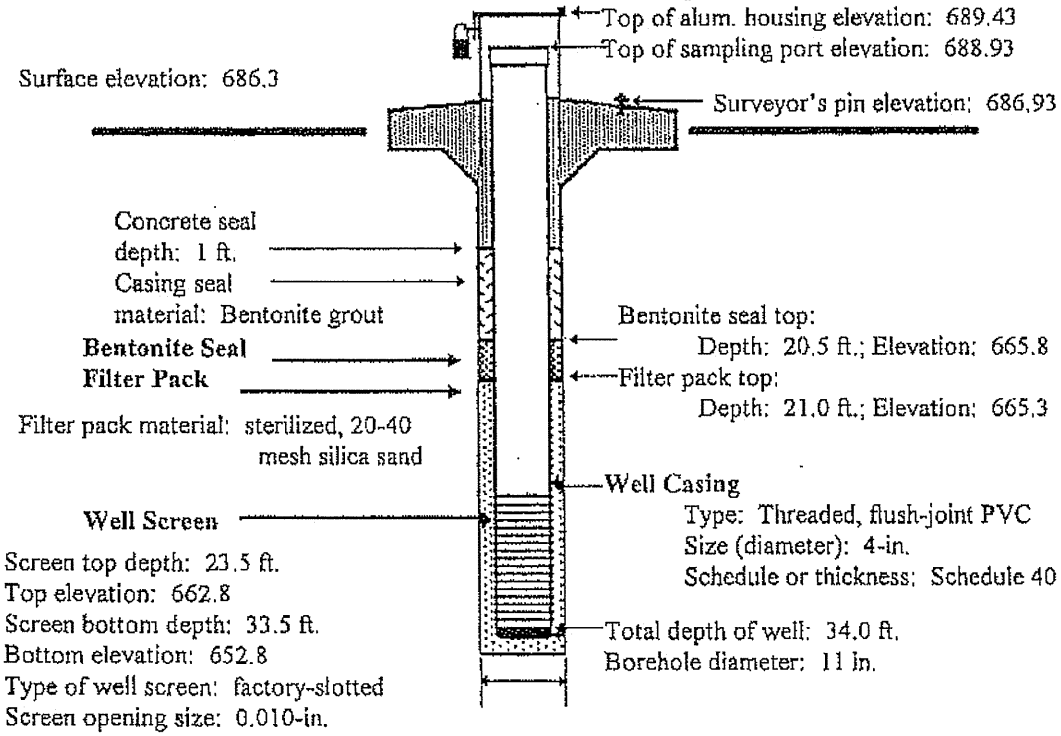
FIGURE A.3

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-18
Date of monitoring well installation: May 22, 1995
Date of monitoring well development: August 15, 1995
Well location: Latitude (or Northing): 202.0 Longitude (or Easting): -356.6
Monitoring well groundwater gradient: Upgradient? Yes Downgradient?
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 670.41
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-19

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 530.3 N 1243.1
Surface El.: 671.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		CLAYEY SAND, brown, moist, w/ironstone gravel, rootlets		1.5								
			670.9										
5	CS-2		SANDY CLAY, reddish-orange & tan to orange, tan & gray mottled, moist, firm to stiff, w/ironstone gravel, iron nodules, iron stains, blocky, roots		2.5 2.0								
			- increased sand & silt content, sand seams below 4.0 ft.										
			667.4										
10	CS-3		- poorly cemented sandstone layer 5.5 to 6.0 ft.										
			SAND, w/clay seams, yellowish-tan, moist to wet, occasional iron-cemented laminations, sandstone seams, uncemented sand, fine-grained, angular										
	CS-4												
15			- dark orange-red iron stains - red iron-cemented sandstone seam										
			653.4										
	CS-5		- ironstone gravel seam @ bottom		4.0								
20			SANDY SHALE, gray, very stiff, very slightly moist, light gray sand partings, occasional tan sand seams, some carbonaceous material		4.5 4.0								
			650.4										
			649.4		4.5+								
	CS-6		- well-cemented mudstone & shell hash seam @ 21.0 ft.		3.0								
	CS-7		648.4										
25			SHALE, dark gray, hard, dry, fossiliferous, w/sand, carbonaceous, blocky - well cemented mudstone seams @ 22.0 ft.		4.0								
			SILTY SHALE, gray, stiff, very slightly moist, occasional sand partings, occasional shell fragments										
			643.4										
	CS-8		- well-cemented mudstone seam @ 23.0 ft.		3.5								
30			SHALE, w/sand, dark gray to gray, hard, slightly moist, some shell fragments at top, light gray sand partings		2.5								
			637.9										
	CS-9		- increasing sand content below 27.0 ft.										
35			SANDY SHALE, gray, moist, very stiff to stiff, w/sand seams & partings, thin mudstone seams, carbonaceous										
	CS-10		SAND, gray, moist to wet, uncemented, fine to medium-grained, angular, w/some sandy shale laminations below 38.0 ft.										
			630.4										
40			- silty shale layer @ 36.0 ft.		4.0 4.5								
			627.9										
			SANDY SHALE, gray, slightly moist, very stiff, light gray sand partings, mudstone seams, carbonaceous, some shell fragments										
45													
50													

Completion Depth: 43.5 ft.
Date Boring Started: 5/16/95
Date Boring Completed: 5/17/95
Engineer/Geologist: M. Brown
Project No.: 65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 42.2'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

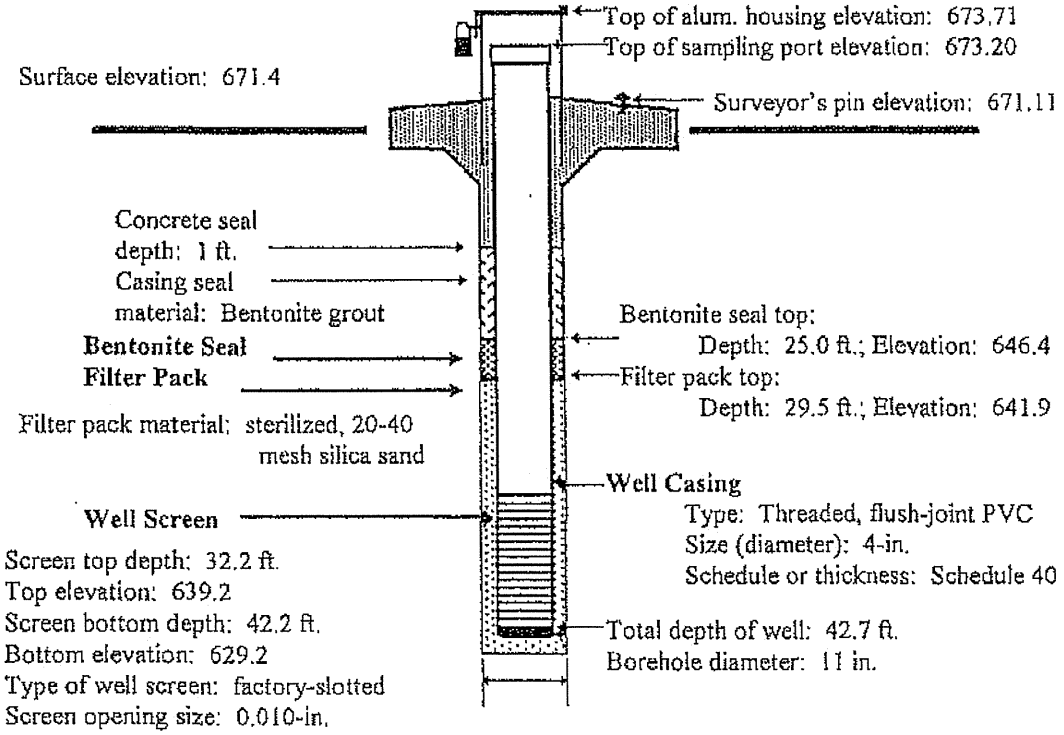
FIGURE A.4

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-19
Date of monitoring well installation: May 17, 1995
Date of monitoring well development: August 10, 1995
Well location: Latitude (or Northing): 1243.1 Longitude (or Easting): 530.3
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 649.31
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-20

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 1066.4 N 1345.4
Surface El.: 658.6' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION		Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SANDY CLAY, reddish-brown (FILL)	657.6										
5			SANDY CLAY W/GRAVEL, reddish & yellowish brown, slightly moist, hard to stiff, w/red & yellow iron stains, coarse ironstone gravel & iron nodules, iron-cemented sandstone fragments, blocky, gypsum, rootlets	649.6										
10			SANDY SHALY CLAY, w/silt, gray & tan moist, firm, w/sandy clay & tan sand seams, light gray sand partings, gypsum, iron stains, occasional iron nodules	646.1										
15			SANDY SHALY CLAY, light brownish gray, very stiff, slightly moist to moist, w/sand seams, yellow & orange iron stains, carbonaceous, gypsum	642.6										
			CLAYEY SAND, light brownish-gray, moist to wet, yellow to orange iron stains, carbonaceous	641.6 639.6										
20			SANDY SHALE, gray, hard, slightly moist, w/light gray sand partings & seams, carbonaceous											
25														
30														
35														
40														
45														
50														

Completion Depth: 19.0 ft.
Date Boring Started: 5/22/95
Date Boring Completed: 5/22/95
Engineer/Geologist: M. Brown
Project No.: 65500-011-070

Remarks: Boring advanced using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/5' screen set to 18.5'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

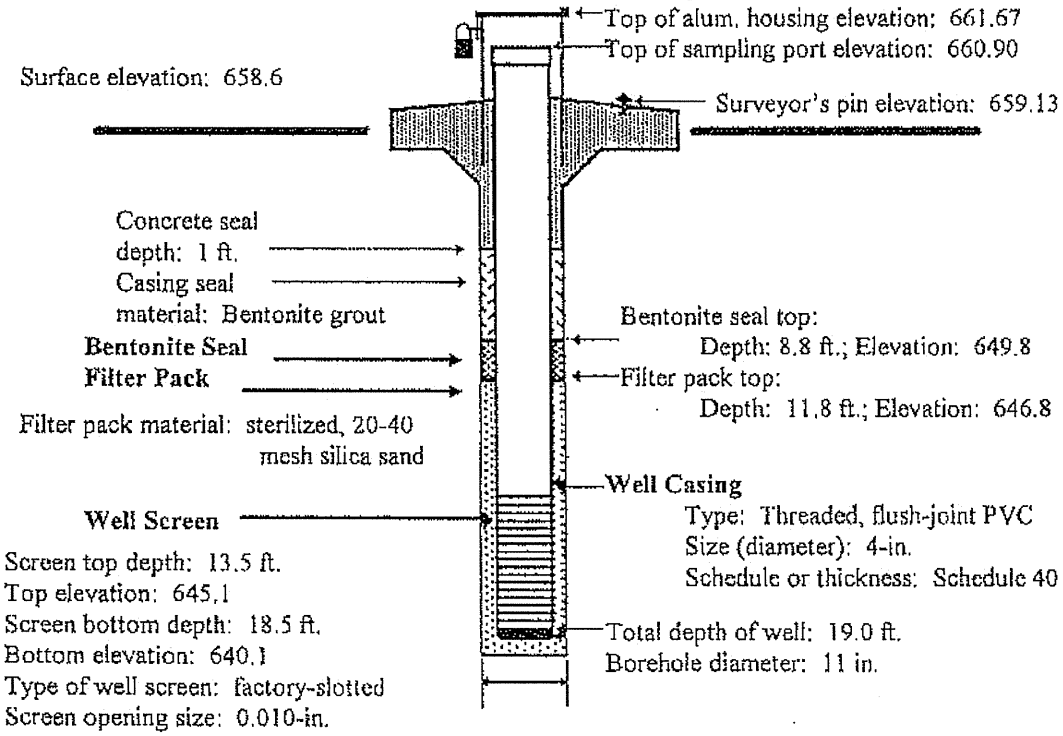
FIGURE A.5

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-20
Date of monitoring well installation: May 22, 1995
Date of monitoring well development: July 25, 1995
Well location: Latitude (or Northing): 1345.4 Longitude (or Easting): 1066.4
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 645.54
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-21

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 1080.6 N 1344.6
Surface El.: 658.7' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		SANDY CLAY, reddish-brown (FILL) 657.7										
			SANDY CLAY W/GRAVEL, reddish & yellowish brown, slightly moist, hard to stiff, w/red & yellow iron stains, coarse ironstone gravel & iron nodules, iron-cemented sandstone fragments, blocky, gypsum, rootlets		4.5+								
5	CS-2		- stiff, increased moisture, black stains @ 4.8 ft.		2.0								
			- free moisture @ 8.5 ft. 650.2		2.0								
10	CS-3		- ironstone seam @ bottom		1.5								
			SANDY SHALY CLAY, w/silt, gray & tan, moist, firm, w/sandy clay & tan sand seams, light gray sand partings, gypsum, iron stains, occasional iron nodules 646.2										
15	CS-4		- sandy ironstone gravel seam, wet @ 12.3 ft., wet 642.7		3.5								
			SANDY SHALY CLAY, light brownish gray, very stiff, slightly moist to moist, w/sand seams, yellow & orange iron stains, carbonaceous, gypsum 641.7		3.5								
20	CS-5		- moist & weathered below 14 ft., increased sand & silt		4.5+								
			CLAYEY SAND, light brownish-gray, moist to wet, yellow to orange iron stains, carbonaceous										
25	CS-6		- iron stained sandstone seam @ 17.0 ft.										
	CS-7		SANDY SHALE, gray, hard, slightly moist, w/light gray sand partings & seams, carbonaceous 631.2										
			- increased sand & less cohesion below 19.0 ft. 630.2										
30	CS-8		- hard mudstone seam @ 26 ft.										
			- hard sandstone & shell hash seam @ 26.5 ft.										
			- tan mudstone seam @ 26.7 ft.										
			SAND, light gray, moist, fine to medium-grained, subrounded to subangular										
35			SANDY SHALE, gray, fossiliferous										
			- very hard seams below 39.5 ft. (cemented sandstone, mudstone, pyrite)										
			- iron-cemented sandy shale seams 33.5 to 34 ft.										
	CS-9		- decreased sand										
40			- increased sand										
			- thin mudstone seams below 42 ft.										
	CS-10		- iron nodules 613.9										
45													
50													

Completion Depth:	45.0 ft.
Date Boring Started:	5/18/95
Date Boring Completed:	5/19/95
Engineer/Geologist:	M. Brown
Project No.:	65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 43.8'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

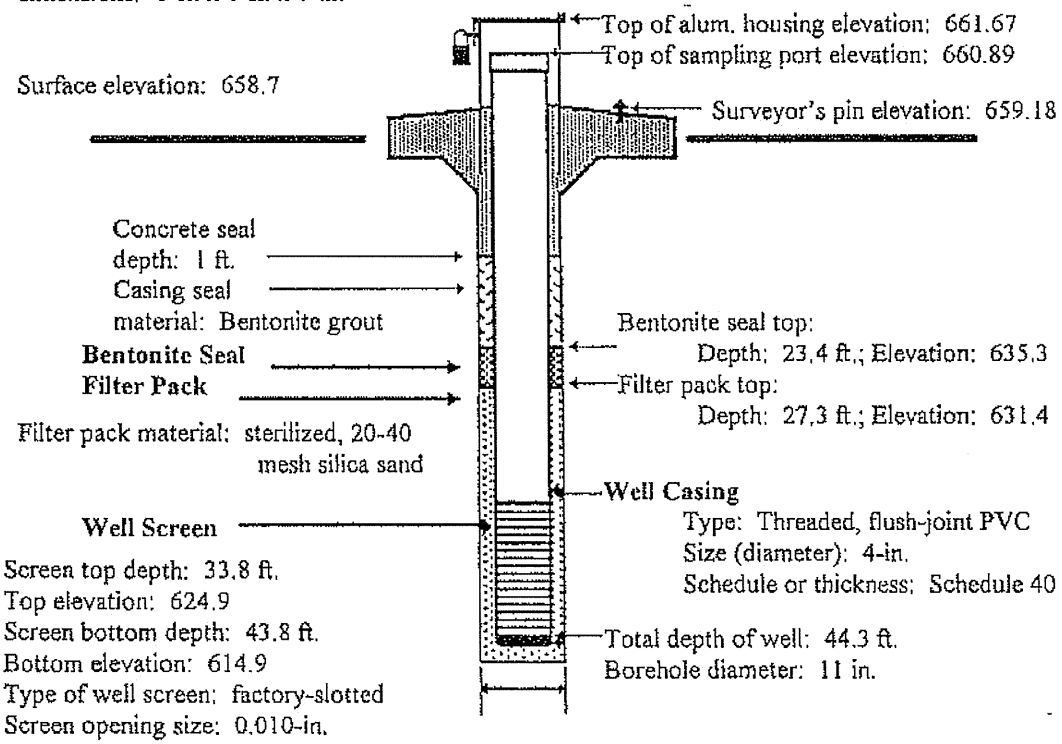
FIGURE A.6

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-21
Date of monitoring well installation: May 19, 1995
Date of monitoring well development: July 25, 1995
Well location: Latitude (or Northing): 1344.6 Longitude (or Easting): 1080.6
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 645.52
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-22

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 1354.0 N 1344.4
Surface El.: 669.9' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0			SANDY CLAY W/GRAVEL, tan, moist, iron stains (FILL)										
			662.9										
5			SANDY CLAY W/GRAVEL, reddish-tan, slightly moist, stiff, blocky, heavily iron stained, w/gravel sized iron nodules & iron-cemented sandstone, rootlets										
			660.9										
10			SANDY CLAY, tan & gray, slightly moist, very stiff, slightly shaly, tan sand seams & light gray sand partings, iron stains										
			656.9										
15			SAND, tan, slightly moist to moist, w/occasional shaly clay seams & gypsum, unconsolidated										
20													
25													
			641.9										
30			SANDY SHALE, gray, hard, dry, carbonaceous, slickensides, w/sandstone seams & sand partings										
			640.4										
35													
40													
45													
50													

Completion Depth:	29.5 ft.
Date Boring Started:	5/24/95
Date Boring Completed:	5/24/95
Engineer/Geologist:	M. Brown
Project No.:	65500-011-070

Remarks: Boring advanced using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/5' screen set to 27.9'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

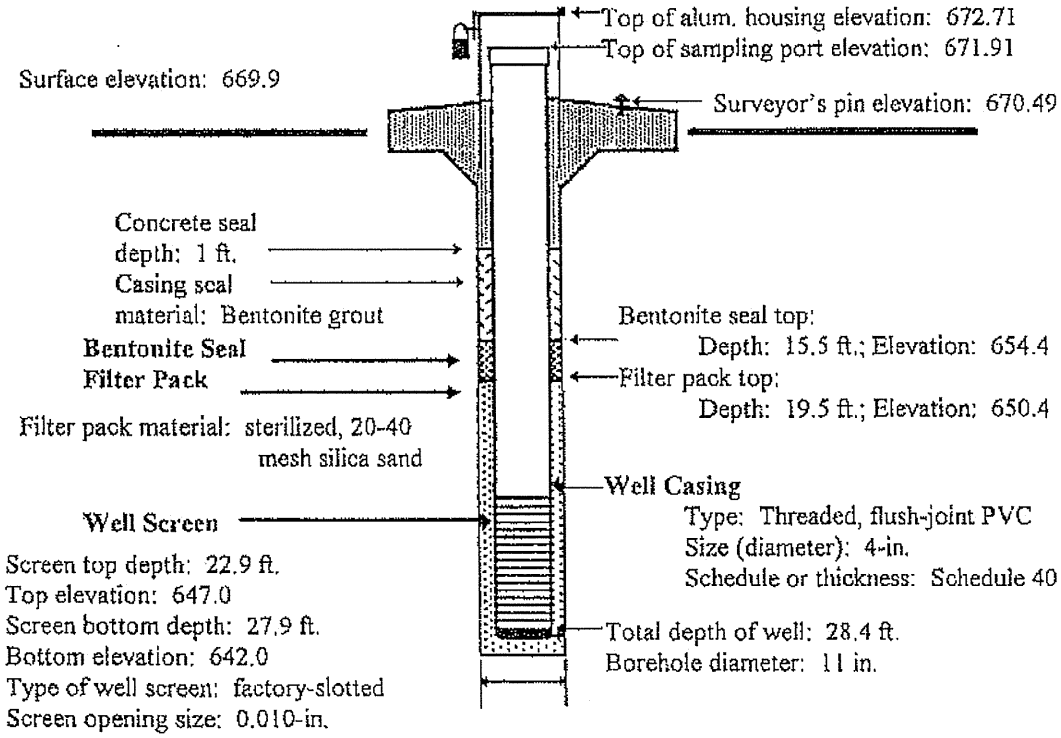
FIGURE A.7

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-22
Date of monitoring well installation: May 24, 1995
Date of monitoring well development: July 28, 1995
Well location: Latitude (or Northing): 1344.4 Longitude (or Easting): 1354.0
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 645.01
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-23

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 1365.7 N 1342.8
Surface El.: 669.9' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
5	CS-1		SANDY CLAY W/GRAVEL, tan, moist, iron stains (FILL)										
	CS-2												
			662.9										
			SANDY CLAY W/GRAVEL, reddish-tan, slightly moist, stiff, blocky, heavily iron stained, w/iron nodules, gravel & iron-cemented sandstone, rootlets		3.0								
	CS-3		660.9										
10			SANDY CLAY, tan & gray, slightly moist, very stiff, slightly shaly, tan sand seams & light gray sand partings, clayey sand layer from 10 to 11 ft., iron stains, increased gray & shaly below 11 ft.		4.0 1.5								
			- increased sand below 12.5 ft.		4.0								
			656.9										
15	CS-4		SAND, tan, slightly moist to moist, w/occasional shaly clay seams & gypsum, unconsolidated, medium-grained, subrounded to angular, iron stains & shaly clay seams @ top, less clay seams below 14.0 ft.										
	CS-5		- increased sandy shaly clay seams w/rootlets & iron stains below 17 ft.										
20			- tan poorly cemented sandstone seams @ 19.0 ft.										
	CS-6		- increased sandy clayey shale seams, carbonaceous below 20.0 ft.										
25			- increased moisture below 23 ft.										
			641.9										
	CS-7		SANDY SHALE, gray, hard, dry, carbonaceous, slickensides, w/sandstone seams & sand partings		3.0								
30	CS-8		- w/ironstone, mudstone & shell hash layer @ 28.5 ft.										
	CS-9		- increased sand content & moisture below 30.5 ft., fossiliferous										
35			- moist shaly sand layer from 32.5 to 33.3 ft.										
			- silty, less sand, decreased moisture, hard, dry, fissile, weak cohesion between horizontal planes, fossiliferous below 34.5 ft.		4.5+								
	CS-10		- blocky @ 36.3 ft.										
40			- increased cohesion to 37.5 ft.										
			- increased sand partings below 37 ft.										
			- weak cohesion, sandy below 37.5 ft.										
45													
50													

Completion Depth:	54.0 ft.
Date Boring Started:	5/23/95
Date Boring Completed:	5/23/95
Engineer/Geologist:	M. Brown
Project No.:	65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 52.5'.

Continued Next Page

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

FIGURE A.8

LOG OF MONITOR WELL NO. MW-23

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 1365.7 N 1342.8
Surface El.: 669.9' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			SANDY SHALE, gray, hard, dry, carbonaceous, slickensides, w/sandstone seams & sand partings										
			615.9										

55
60
65
70
75
80
85
90
95
100

Completion Depth: 54.0 ft.
Date Boring Started: 5/23/95
Date Boring Completed: 5/23/95
Engineer/Geologist: M. Brown
Project No.: 65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3' x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 52.5'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

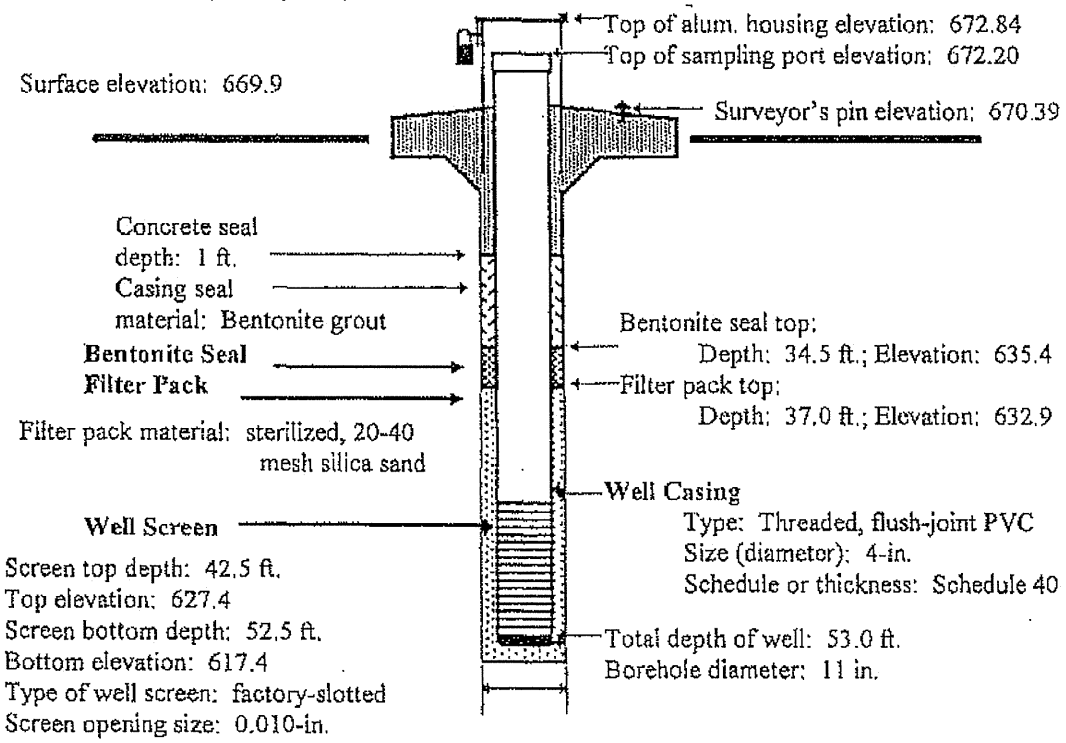
FIGURE A.9

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-23
Date of monitoring well installation: May 23, 1995
Date of monitoring well development: July 31, 1995
Well location: Latitude (or Northing): 1342.8 Longitude (or Easting): 1365.7
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 641.89
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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LOG OF MONITOR WELL NO. MW-26

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 2640.4 N 1230.7
Surface El.: 654.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		CLAYEY SAND, tan & reddish brown, iron-cemented gravel, iron stains, roots		2.5								
			653.4										
			CLAY, w/sand, olive brown, to reddish brown, stiff, red & dark red iron stains, fine iron-cemented gravel		2.0								
5	CS-2		- increased sand below 4.0 ft.		2.5								
			- dark red iron-cemented sandstone seam @ 4.2 ft.										
			645.4		3.0								
10	CS-3		CLAYEY SAND, tan & reddish brown, moist, w/dark red iron-cemented gravel, iron stains										
	CS-4		- free moisture below 14 ft.										
15			- increased clay										
			637.9										
			- dark red iron-cemented seam @ 16.5 ft.		4.0								
			SANDY CLAY, gray, yellow & tan, very stiff to stiff, slightly moist, w/sand seams, iron-cemented		2.5								
	CS-5		634.4										
20			gravel, iron nodules, yellowish & dark red iron stains, gypsum		2.5								
	CS-6		- increased sand below 19.5 ft.										
			SANDY SHALE, gray, slightly moist, stiff, w/moist light gray sand seams & partings, occasional iron stained sandy clay seams, carbonaceous										
25	CS-7		- hard mudstone seam @ 24.5 ft.										
	CS-8		- hard mudstone seam @ 25.5 ft.										
	CS-9		- hard mudstone seam @ 26.0 ft.										
30			- silty, very stiff @ 28 ft.										
			- increased moisture below 29 ft.		4.0								
			- hard mudstone seam @ 33.5 ft.										
35	CS-10		- increased carbonaceous material, clayey, blocky,										
			some slickensides, jointed, and wet below 34 ft.										
			618.4										
	CS-11		SHALY SAND, light gray, wet, carbonaceous, fine to medium-grained, angular										
			615.4										
40	CS-12		SHALE, w/sand, gray, hard, slightly moist, w/light gray sand partings, carbonaceous		4.0								
			- hard mudstone seam @ 40 ft.										
			611.4										
45													
50													

Completion Depth:	43.0 ft.
Date Boring Started:	5/15/95
Date Boring Completed:	5/16/95
Engineer/Geologist:	M. Brown
Project No.:	65500-011-070

Remarks: Boring advanced using 7-1/2" O.D. HSA w/3" x 5' continuous sampler. Borehole reamed using 10-1/4" O.D. HSA w/11" bit & reverse-flight augers. 4" dia. PVC casing w/10' screen set to 42.5'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

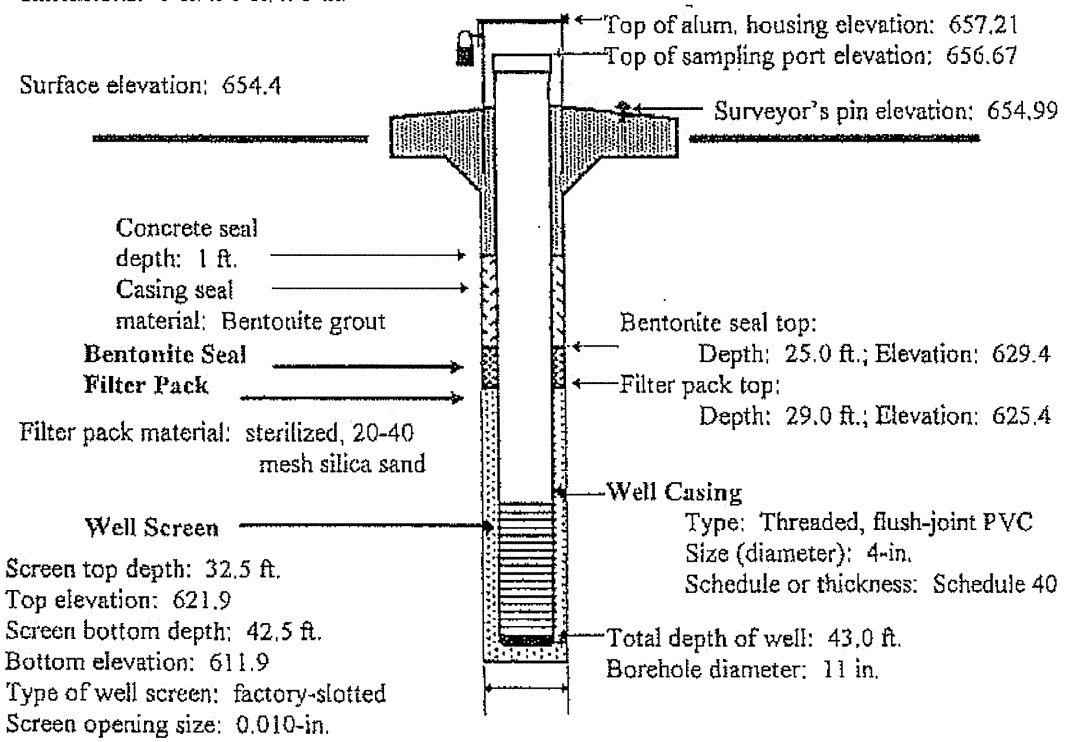
FIGURE A.10

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-26
Date of monitoring well installation: May 16, 1995
Date of monitoring well development: August 11, 1995
Well location: Latitude (or Northing): 1230.7 Longitude (or Easting): 2640.4
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 637.96
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



Screen top depth: 32.5 ft.
Top elevation: 621.9
Screen bottom depth: 42.5 ft.
Bottom elevation: 611.9
Type of well screen: factory-slotted
Screen opening size: 0.010-in.

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LOG OF MONITOR WELL NO. MW-27

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 2507.6 N 14.7
Surface El.: 686.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	CS-1		SILTY SANDY CLAY, reddish-brown, very stiff, slightly moist, w/iron stains, iron-cemented sandstone nodules, gypsum, less sand from 1.5 to 2.5 ft.										
			683.9										
5	CS-2		SAND, reddish brown, slightly moist, iron stained, fine to medium-grained, subangular, w/iron-cemented sandstone nodules, occasional sandy clay seams		1.0								
			682.4										
			681.4										
10	CS-3		SANDY CLAY, gray & tan, moist, firm, w/fine gravel, iron stains & iron nodules										
			677.4										
			SAND, yellow tan to dark reddish brown, moist, w/sandstone seams, iron stains, w/black iron stained sandstone nodules, fine to medium-grained, subangular, reddish from 7 to 7.5 ft., occasional light gray fine sand seam - ironstone gravel seam @ 8.7 ft., wet										
15	CS-4		672.9										
			671.4										
	CS-5		SANDY SHALY CLAY, light gray to gray & tan, stiff, moist, w/moist sandstone seams, sand partings & seams, iron stains & iron nodules, iron replaced gastropod shells, rootlets - brownish gray, very stiff @ 13.2 ft.										
20	CS-6		666.4										
	C-7		SANDY SHALE, dark brownish-gray & orange, slightly moist, fissile, friable, iron stained, w/light gray sand pockets, carbonaceous, weathered										
			661.9										
25			SANDY SHALE, gray, very slightly moist, fissile, friable, light gray sand partings, carbonaceous - increased cohesion 18 to 19 ft. - increased friability & sand below 19 ft.										
			660.9										
30	C-8		SANDSTONE, gray, moist, w/sandy shale seams, carbonaceous, occasional lignite & pyrite pockets, fine-grained, subrounded, moderately cemented siltstone seam @ 22.0 ft.		4.5+								
			SANDSTONE, reddish tan, hard, iron-cemented, w/mudstone seams & lignite										
35			SHALE, w/sand, gray, hard, w/light gray sand partings, tan mudstone & siltstone seams & layers, fossiliferous - silty mudstone seam @ 28 ft. - silty mudstone seams @ 30 ft. - silty mudstone seam @ 34.5 ft. - well indurated tan mudstone seam @ 38 ft. - silty mudstone layer @ 41 ft.										
40	C-9												
45													
50	C-10												

Completion Depth: 87.0 ft.
Date Boring Started: 5/24/95
Date Boring Completed: 5/31/95
Engineer/Geologist: M. Brown
Project No.: 65500-015-070

Remarks: Boring advanced using wet rotary w/NX core barrel & reamed w/9-7/8" tri-cone rock bit to 83'. 4" dia. PVC casing w/10' screen set to 80.2'.

Continued Next Page

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

FIGURE A.11

LOG OF MONITOR WELL NO. MW-27

Project Description: TURKEY CREEK LANDFILL - Monitor Well Installation
Johnson County, Texas

Location: E 2507.6 N 14.7
Surface El.: 686.4' MSL

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Monitor Well Construction Detail	Hand Penetrometer tsf	Penetration Blows / Foot	Moisture Content, %	Unit Dry Weight, lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
55			SHALE, w/sand, gray, hard, w/light gray sand partings, tan mudstone & siltstone seams & layers, fossiliferous - cemented sandstone layer w/lignite @ 50 ft. - increased sand content below 51 ft., sandstone seams - hard siltstone seam @ 52 ft. - hard siltstone layer @ 53 ft.										
60	C-11		- hard siltstone seam @ 54 ft. - less cohesive @ 54.5 to 56 ft. - hard siltstone seam @ 56.5 ft. - hard siltstone seam @ 60.5 ft. - hard siltstone seam @ 62.5 ft.										
65													
70	C-12		- hard siltstone layer @ 68 ft. - hard siltstone seam @ 69.5 ft. - hard siltstone seam @ 70.5 ft.										
75													
80	C-13		- less cohesive @ 77 ft. to 86 ft., increased sand content and sandstone seams below 77 ft.										
85			- increased cohesion, decreased sand partings 599.4										
90													
95													
100													

Completion Depth: 87.0 ft.
Date Boring Started: 5/24/95
Date Boring Completed: 5/31/95
Engineer/Geologist: M. Brown
Project No.: 65500-011-070

Remarks: Boring advanced using wet rotney w/NX core barrel & reamed w/9-7/8" tri-cone rock bit to 83'. 4" dia. PVC casing w/10' screen set to 80.2'.

EMCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

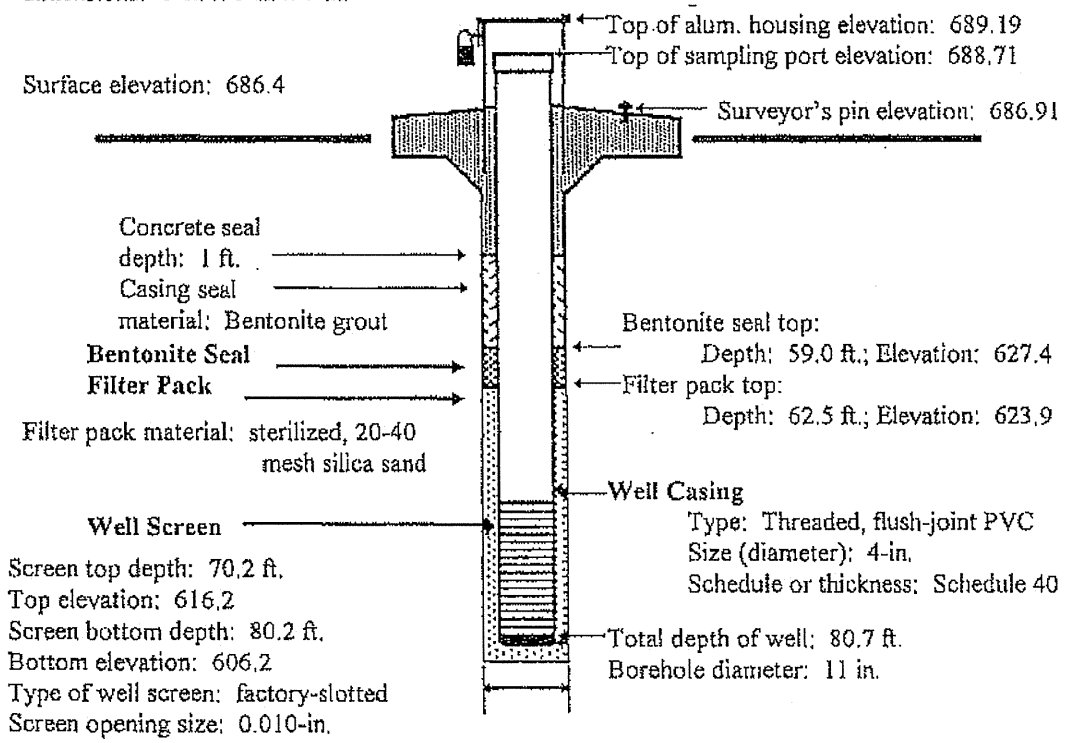
FIGURE A.12

TNRCC SE-67

MONITORING WELL DATA SHEET

Permittee or site name: Laidlaw Waste Systems, Inc. - Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County, Texas
Monitoring well I.D. No.: MW-27
Date of monitoring well installation: May 31, 1995
Date of monitoring well development: August 15, 1995
Well location: Latitude (or Northing): 14.73 Longitude (or Easting): 2507.6
Monitoring well groundwater gradient: Upgradient? Downgradient? Yes
Monitoring well driller name: Donald Foster License No.: 2023
Geologist or engineer supervising well installation: Michael Brown, Geologist
Static water-level elevation (feet above mean sea level) after well development: 639.57
Name of geologic formation(s) in which well is completed: Woodbine Formation

Type of locking device: Padlock
Type of well casing protection: 6-in. x 6-in. x 5 ft. aluminum housing
Concrete surface pad
dimensions: 6-ft. x 6-ft. x 6-in.



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1999 EMCON

GROUNDWATER MONITOR WELL BORING LOGS

LOG OF BORING NO. MW-24

Project Description: Turkey Creek Landfill
Alvarado, Texas

Location: E 2009.2 N 1380.5
Surface El: 659.30

Depth (ft)	Samples	Nominal USCS	MATERIAL DESCRIPTION	Elev.	Construction Detail	Hand Penetrometer (tsf)	PI (Hyper)	Moisture Content, %	Unit Dry Weight, lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			SILTY CLAYEY SAND, light reddish brown & tan, very slightly moist, iron stains	656.3										
5			SANDY CLAY, red, tan & gray, hard, dry, blocky, yellow & red iron stains, ironstone nodules, manganese dioxide stains, rootlets	651.8		4.5+ / 4.5+								
10			SANDY CLAY, brown, hard, dry, blocky, ironstone nodules, pinted, rootlets	648.3		4.5+								
			SANDY CLAY, w gravel, reddish, tan & orange, hard, very slightly moist, abundant ironstone gravel, yellow & red iron stains	645.8		4.5+								
15			SANDY CLAYEY SHALE, reddish brown, gray & orange, dry, stiff, sand seams & partings, laminated, gypsum, orange & black iron stains	641.3		3.0 / 3.0								
20			CLAYEY SAND, brown & yellow-tan, wet, shaly clay seams, iron stains, fine-grained	634.0										
25			SANDY SHALE, dark grey, hard, slightly moist, light gray sand partings	631.3		4.5+								
30														
35														
40														
45														
50														
55														

Completion Depth: 28.0 ft.
Date Boring Started: 3/22/99
Date Boring Completed: 3/22/99
Engineer/Geologist: M. Brown
Project No.: 65500.001.102

Remarks: Boring advanced using 8 in. O.D. hollow-stem augers; 4 in. dia. PVC well w/5 ft. slotted 0.010 in. screen set in open hole to 25.6 ft., top of filter pack 18.5 ft. below ground surface, static water level 17.84 ft. below TOC (elev. 661.87) on 4/19/99.

EDCON

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

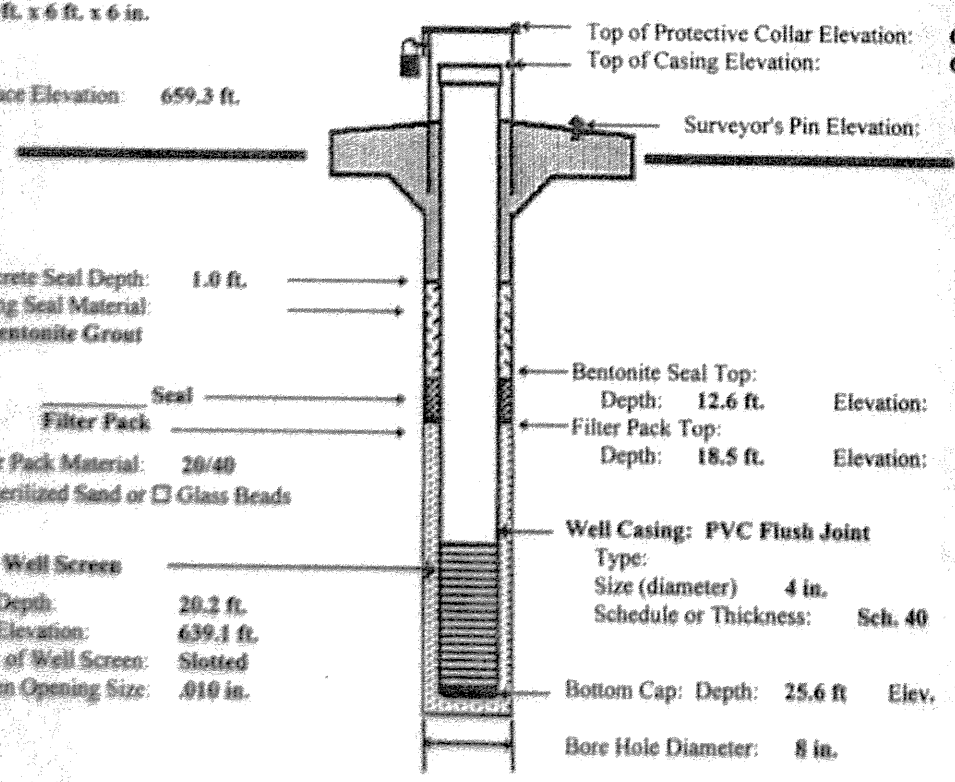
MONITOR WELL DATA SHEET

Permittee or Site Name: **Turkey Creek Landfill**
MSW Permit No.: **1417B** County: **Johnson**
Monitor Well I.D. No. **MW-24**
Date of Monitor Well Installation: **3/22/99**
Date of Monitor Well Development: **3/26/99**
Well Location: Latitude (or Northing): **1380.50** Longitude (or Easting): **2009.22**
Monitor Well Groundwater Gradient: Upgradient?: Downgradient?: ✔
Monitor Well Driller Name: **Tommy Hilton** License No.: **4981**
Geologist or Engineer Supervising Well Installation: **Michael Brown, Geologist**
Static Water Level Elevation (with respect to msl) after Well Development: **644.03 ft. (4/19/99)**
Name of Geologic Formation(s) in which Well is Completed: **Woodbine**

Type of Locking Device: **Padlock** Type of Casing Protection: **6 in. by 6 in. by 5 ft. Aluminum**

Concrete Surface Pad Dimensions:
6 ft. x 6 ft. x 6 in.

Surface Elevation: **659.3 ft.**



Top of Protective Collar Elevation: **661.68 ft.**
Top of Casing Elevation: **661.87 ft.**
Surveyor's Pin Elevation: **659.61 ft.**

Concrete Seal Depth: **1.0 ft.**
Casing Seal Material:
Bentonite Grout

Seal
Filter Pack

Filter Pack Material: **20/40**
☒ Sterilized Sand or ☐ Glass Beads

Well Screen

Top Depth: **20.2 ft.**
Top Elevation: **639.1 ft.**
Type of Well Screen: **Slotted**
Screen Opening Size: **.010 in.**

Bentonite Seal Top:
Depth: **12.6 ft.** Elevation: **646.7 ft.**
Filter Pack Top:
Depth: **18.5 ft.** Elevation: **640.8 ft.**

Well Casing: PVC Flush Joint
Type:
Size (diameter) **4 in.**
Schedule or Thickness: **Sch. 40**

Bottom Cap: Depth: **25.6 ft** Elev. **633.7 ft.**

Bore Hole Diameter: **8 in.**

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May 28, 1999

LOG OF BORING NO. MW-25

Project Description: Turkey Creek Landfill
Alvarado, Texas

Location: E 2025.6 N 1379.0
Surface El: 659.10

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Elevation	Construction Detail	Hand Penetrometer (tsf)	PID (ppm)	Moisture Content, %	Unit Dry Weight, lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
			SILTY CLAYEY SAND, light reddish brown & tan, very slightly moist, iron stains	656.1										
5			SANDY CLAY, red, tan & gray, hard, dry, blocky, yellow & red iron stains, ironstone nodules, manganese dioxide stains, rootlets	651.6										
10			SANDY CLAY, brown, hard, dry, blocky, ironstone nodules, jointed, rootlets	648.1										
			SANDY CLAY, w/ gravel, reddish, tan & orange, hard, very slightly moist, abundant ironstone gravel, yellow & red iron stains	645.6										
15			SANDY CLAYEY SHALE, reddish brown, gray & orange, dry, stiff, sand seams & partings, laminated, gypsum, orange & black iron stains	641.1										
20			CLAYEY SAND, brown & yellow-tan, wet, shaly clay seams, iron stains, fine-grained											
25				633.6										
			SANDY SHALE, dark gray, hard, slightly moist, light gray sand partings & seams, mudstone seams, fossiliferous			4.5+								
30			- hard sandstone seam at 35.0 ft., carbonaceous											
35			- mudstone seam											
			- light gray laminated sand seam, lightly cemented											
40			- less sand partings from 38.5 ft. to 44.0 ft.											
			- mudstone seam											
			- mudstone seam											
45			- increased sand content below 45 ft.			4.3+								
			- less sand partings below 48 ft.											
50						4.3+								
				606.1										
55														

Completion Depth: 63.0 ft.
Date Boring Started: 3/23/99
Date Boring Completed: 3/23/99
Engineer/Geologist: M. Brown
Project No.: 65500-011.108

Remarks: Boring advanced using 8 in. O.D. hollow-stem augers; 4 in. dia. PVC well w/10 ft. slotted 0.010 in. screen set in open hole to 51.8 ft.; top of filter pack 39.4 ft. below ground surface; stain water level 18.41 ft. below TOC (elev. 661.72) on 4/19/99.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

TNRCC SE-67

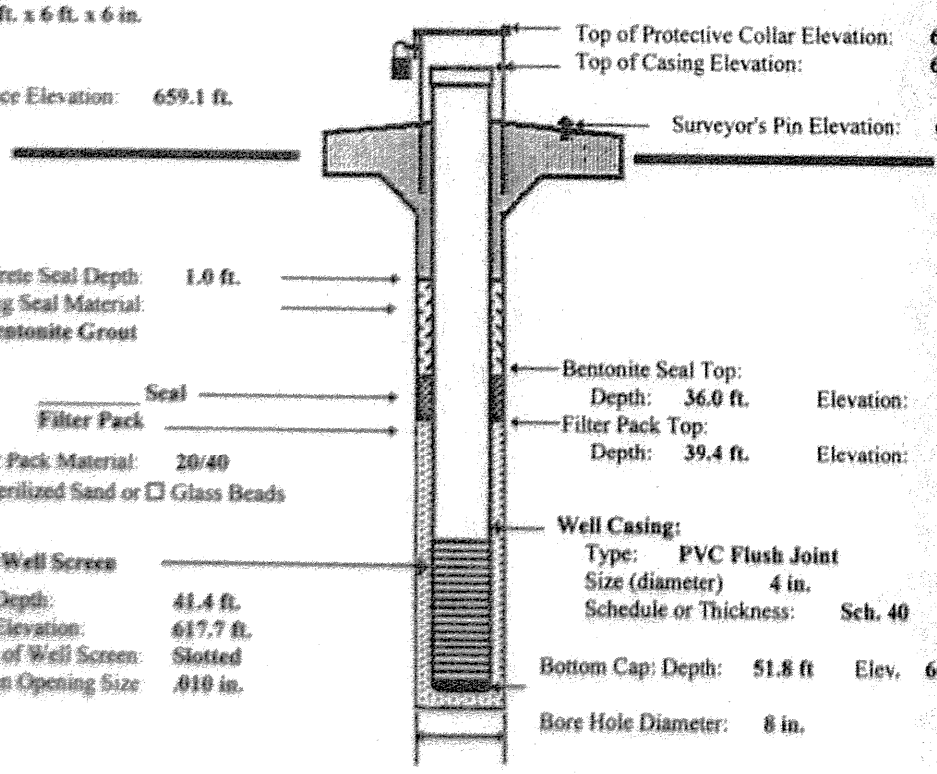
MONITOR WELL DATA SHEET

Permittee or Site Name: **Turkey Creek Landfill**
MSW Permit No.: **1417B** County: **Johnson**
Monitor Well I.D. No. **MW-25**
Date of Monitor Well Installation: **3/23/99**
Date of Monitor Well Development: **4/9/99**
Well Location: Latitude (or Northing): **1378.95** Longitude (or Easting): **2025.62**
Monitor Well Groundwater Gradient: Upgradient?: Downgradient?: ✔
Monitor Well Driller Name: **Tommy Hilton** License No.: **4981**
Geologist or Engineer Supervising Well Installation: **Michael Brown, Geologist**
Static Water Level Elevation (with respect to msl) after Well Development: **640.69 ft. (4/19/99)**
Name of Geologic Formation(s) in which Well is Completed: **Woodbine**

Type of Locking Device: **Padlock** Type of Casing Protection: **6 in. by 6 in. by 5 ft. Aluminum**

Concrete Surface Pad Dimensions:
6 ft. x 6 ft. x 6 in.

Surface Elevation: **659.1 ft.**



Top of Protective Collar Elevation: **661.61 ft.**
Top of Casing Elevation: **661.72 ft.**
Surveyor's Pin Elevation: **659.30 ft.**

Concrete Seal Depth: **1.0 ft.**
Casing Seal Material:
Bentonite Grout

Seal
Filter Pack

Filter Pack Material: **20/40**
☒ Sterilized Sand or ☐ Glass Beads

Well Screen

Top Depth: **41.4 ft.**
Top Elevation: **617.7 ft.**
Type of Well Screen: **Slotted**
Screen Opening Size: **.010 in.**

Bentonite Seal Top:
Depth: **36.0 ft.** Elevation: **623.1 ft.**
Filter Pack Top:
Depth: **39.4 ft.** Elevation: **619.7 ft.**

Well Casing:
Type: **PVC Flush Joint**
Size (diameter) **4 in.**
Schedule or Thickness: **Sch. 40**

Bottom Cap: Depth: **51.8 ft** Elev. **607.3 ft.**

Bore Hole Diameter: **8 in.**

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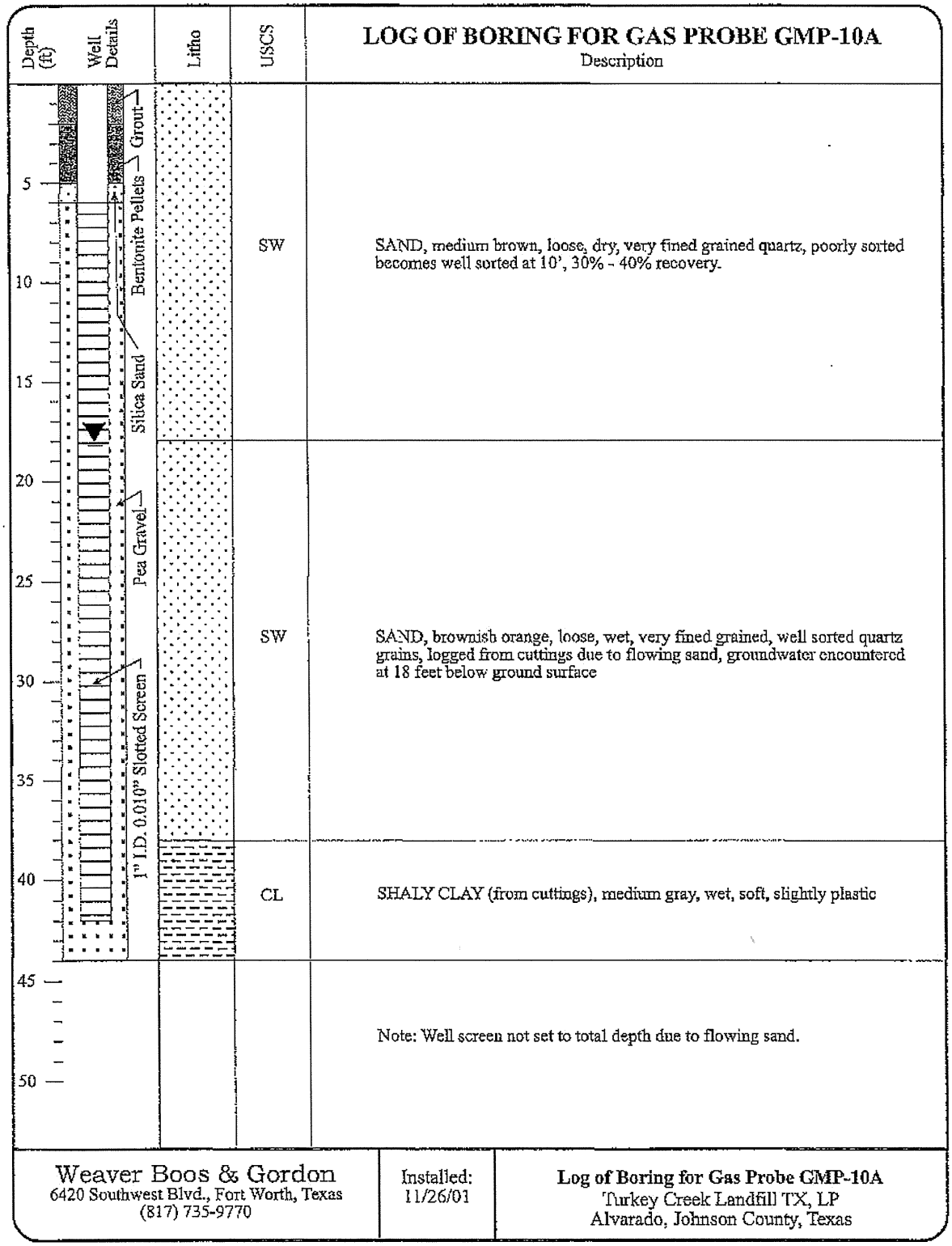
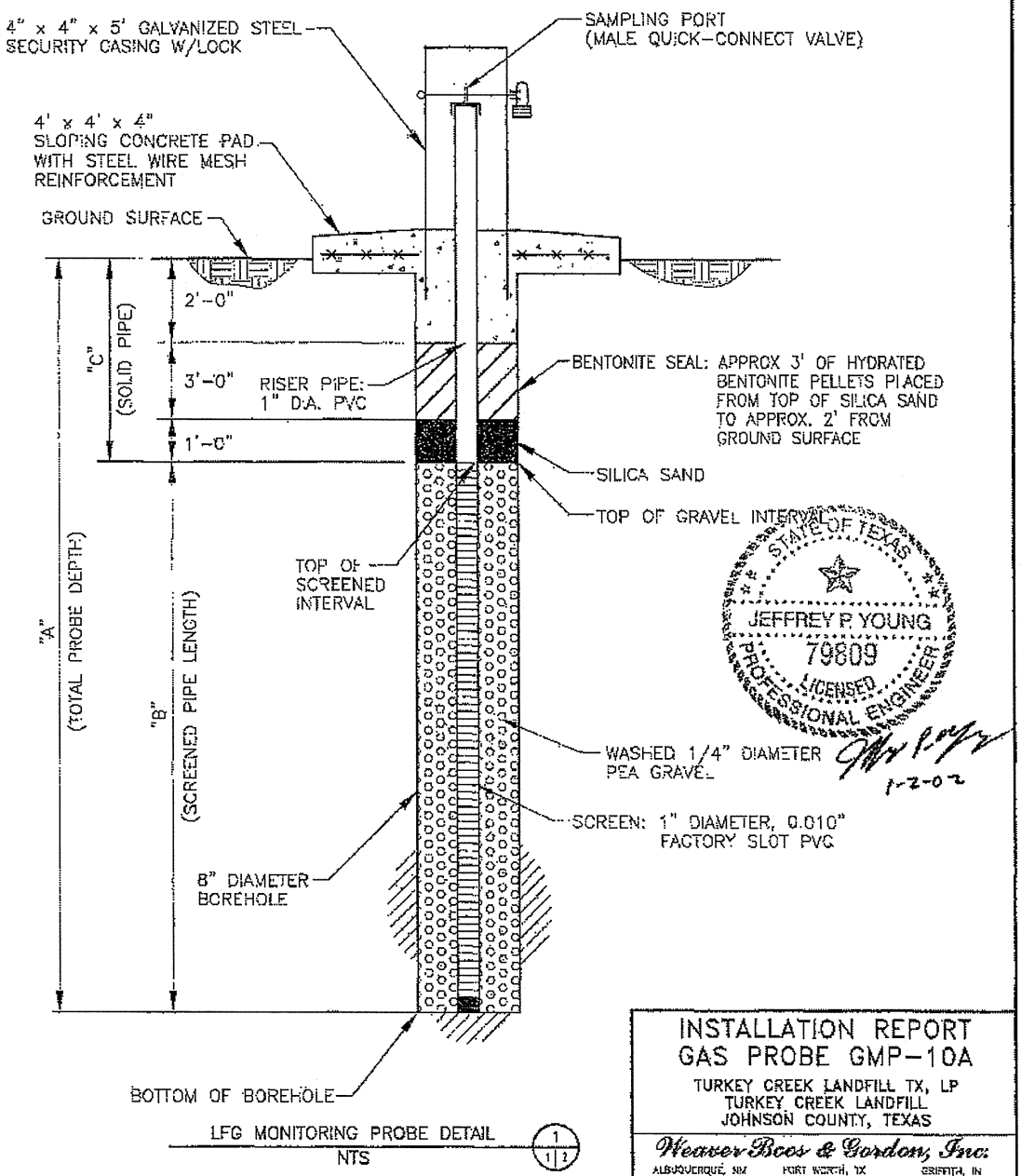
May 28, 1999

2001 WEAVER BOOS AND GORDON
LANDFILL GAS PROBE BORING LOG


Depth (ft)
Well Details
Litho
USCS
LOG OF BORING FOR GAS PROBE GMP-10A
Description
Grout
Bentonite Pellets
Silica Sand
Pea Gravel
1" I.D. 0.010" Slotted Screen
5
10
15
20
25
30
35
40
45
50
SW
SAND, medium brown, loose, dry, very fined grained quartz, poorly sorted becomes well sorted at 10', 30% - 40% recovery.
SW
SAND, brownish orange, loose, wet, very fined grained, well sorted quartz grains, logged from cuttings due to flowing sand, groundwater encountered at 18 feet below ground surface
CL
SHALY CLAY (from cuttings), medium gray, wet, soft, slightly plastic
Note: Well screen not set to total depth due to flowing sand.
Weaver Boos & Gordon
6420 Southwest Blvd., Fort Worth, Texas
(817) 735-9770
Installed:
11/26/01
Log of Boring for Gas Probe GMP-10A
Turkey Creek Landfill TX, LP
Alvarado, Johnson County, Texas

LFG MONITORING PROBE LOCATION

PROBE NO.	TOP ELEV. (FT.)	BOTTOM ELEV. (FT.)	DEPTH OF WASTE WITHIN 1,000 (FT.)	DIM "A" TOTAL PROBE DEPTH (FT.)	DIM "B" SCREENED PIPE DEPTH (FT.)	DIM "C" SOLID PIPE UNDER GRADE (FT.)	APPROX. LOCATION	
							EASTING	SOUTHING (S) NORTHING (N)
GMP-10A	696.50	654.50	656	42	36	6	2316.16	1051.80 (S)



LFG MONITORING PROBE DETAIL (1 1/2)
NTS

STATE OF TEXAS
JEFFREY P. YOUNG
79809
LICENSED PROFESSIONAL ENGINEER
1-2-02

INSTALLATION REPORT
GAS PROBE GMP-10A

TURKEY CREEK LANDFILL TX, LP
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

Weaver Boos & Gordon, Inc.
ALBUQUERQUE, NM · CHICAGO, IL · GLEN ELLYN, IL · FORT WORTH, TX (817) 735-9770 · GRIFFITH, IN · SOUTH BEND, IN · SPRINGFIELD, IL

DRAWN BY: SRC.	DATE: 12/2001	FILE: C120-72-11-08...DG
REVIEWED BY: BF	CAD: GP-DETL.DWG	FIGURE 2

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2002 THE CAREL CORPORATION
LANDFILL GAS PROBE BORING LOGS

The Carel Corporation
Providing Environmental, Ground-Water and Waste Management Services

GAS PROBE NUMBER
GMP-7A

PROJECT NAME: Gas Probe Plug and Relocation
LOCATION: Turkey Creek Landfill
DRILLING CO: Dixie Drilling
DRILLING METHOD: Mud Rotary
GEOLOGIST: Philip M. Ward

BORING DIAMETER: 6"
TOTAL DEPTH: 45'
GROUND SURFACE ELEVATION: 709.4
NORTHING: 1357.9 EASTING: 182.1

DATE BEGUN: 6/3/02 DATE COMPLETED: 6/4/02

DEPTH (BGS)*	LITHOLOGY	DESCRIPTION	MOISTURE	GAS PROBE CONSTRUCTION	ANNULUS MATERIAL	Depth (MSL)*
0.0		SILTY SAND: Brown, with organics (roots) intermixed	(slightly moist)		-cement	
		SANDY CLAY: Brown, with very fine-grained sand			-bentonite plug	705
5.0		CLAYEY SAND: Dark red and tan, with organic traces			-20/40 silica sand	
		SANDSTONE: Tan, poorly cemented	(wet)			700
10.0		-moderate to well cemented				
		-siltstone seam @ 14 ft.				695
15.0						
20.0		-ironstone seam @ 20 ft.				690
		CLAYEY SHALE: Dark gray and wet, with siltstone, sandstone, and lignite seams scattered throughout				
25.0						685
		-ironstone seam @ 28 ft.				
30.0		-siltstone seam @ 30 ft.			-1/4 inch gravel pack	680
		-lignite seam @ 34 ft.				
35.0		-siltstone seam @ 35 ft.				675
		-siltstone seam @ 37.5 ft.				
		-lignite seam @ 38 ft.				
40.0		-siltstone seam @ 40 ft.				670
		-sandstone seam @ 42.5 ft.				
45.0		-GMP-7A set @ 45 ft.				665
50.0						660

*(BGS)-Below Ground Surface
*(MSL)-Mean Sea Level

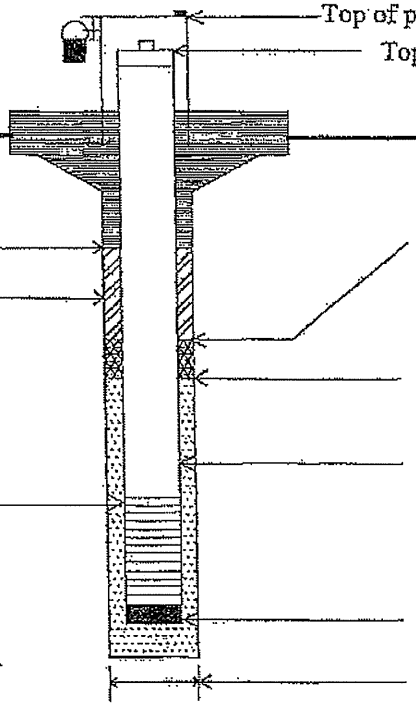
Remarks: Boring advanced using 6" O.D. hollow-stem auger and 5' continuous sampler to 45'. 1" PVC well w/39' screen set to 45'.

GAS PROBE DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
MSW Permit No.: 1417B
County: Johnson County
Gas Monitoring Probe No.: GMP-7A
Date of Monitor Well Installation: 6/3/02 & 6/4/02
Well Location: Latitude (or northing): 1357.9
Longitude (or easting): 182.1
Monitor Well Driller:
Name: Dixie Drilling
License No.: 4707

Note:
Geologist or engineer supervising well installation: Andrew Robertson
Name of geologic formation(s) in which probe is completed: Woodbine

Type of locking device: Padlock
Type of well casing protection: Steel
Concrete surface pad dimensions: 4'x4'x4"
Top of protective collar elevation: 712.42
Top of well casing elevation: 712.33
Surface elevation: 709.4
Concrete seal depth: 2'
Casing seal material: 3' Bentonite Chips
20/40 Sand Seal Top depth: 5' elevation: 704.4
Filter pack material: 1/4 inch Gravel
Filter pack top depth: 6' elevation: 703.3
Well casing Type: PVC Size (diameter): 1" Schedule or thickness: Sch. 4
Well screen
Screen top depth: 6'
Top elevation: 703.4
Type of well screen: PVC
Screen opening size: 0.010"
Bottom cap (depth: 45')
Borehole diameter: 6 in.



The Carel Corporation
Providing Environmental, Ground-Water and Waste Management Services

GAS PROBE NUMBER
GMP-13A

PROJECT NAME: Gas Probe Plug and Relocation
LOCATION: Turkey Creek Landfill
DRILLING CO: Dixie Drilling
DRILLING METHOD: Hollow Stem Auger
GEOLOGIST: Philip M. Ward

BORING DIAMETER: 7"
TOTAL DEPTH: 10'
GROUND SURFACE ELEVATION: 646.9
NORTHING: 1355 EASTING: 2600.1

DATE BEGUN: 5/22/02 DATE COMPLETED: 5/22/02

DEPTH (BGS)*	LITHOLOGY	DESCRIPTION	MOISTURE	GAS PROBE CONSTRUCTION	ANNULUS MATERIAL	Depth (MSL)*
0.0		SILTY SAND: Tan, with organics (roots) top 6"	(slightly moist)		-cement	645
		SANDY CLAY: Brown, with organics (roots), iron nodules, very fine grained sand	(moist)		-bentonite plug	
5.0		SILTY CLAY: Dark Brown, with organics (roots), scattered iron nodules -some very fine-grained sand interbbed to total depth -color change to brown and gray			-20/40 silica sand	640
10.0		-GMP-13A set @ 10 ft.			-1/4 inch gravel pack	635
15.0						630
20.0						625
25.0						620
30.0						615
35.0						610
40.0						

*(BGS)-Below Ground Surface
*(MSL)-Mean Sea Level

Remarks: Boring advanced using 7" O.D. hollow stem auger and 5' continuous sampler to 10'. 1" PVC well w/4' screen set to 10'.

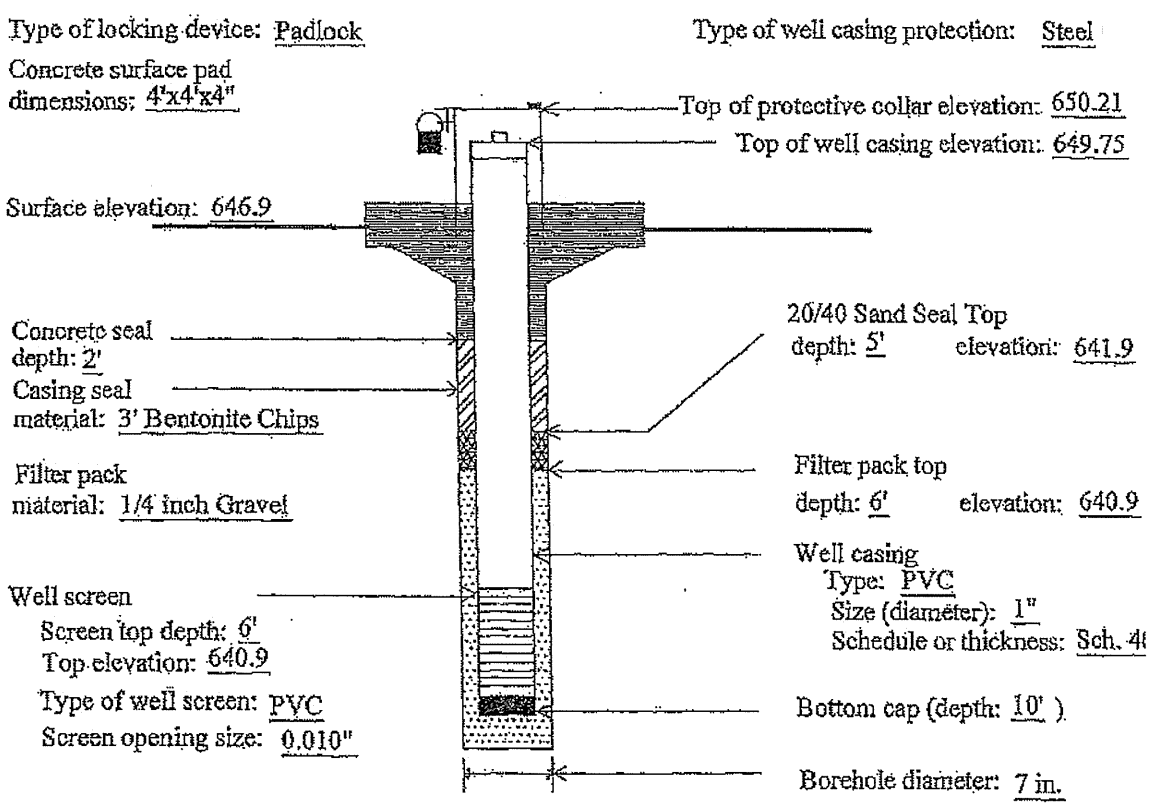
GAS PROBE DATA SHEET

Permittee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 5/22/02
Well Location: Latitude (or northing): 1355
Monitor Well Driller:
Name: Dixie Drilling
License No.: 4707

MSW Permit No.: 1417B
Gas Monitoring Probe No.: GMP-13A

Longitude (or easting): 2600.1

Note:
Geologist or engineer supervising well installation: Philip M. Ward
Name of geologic formation(s) in which probe is completed: Woodbine



2004 WEAVER BOOS CONSULTANTS
LANDFILL GAS PROBE BORING LOG

Figure 2-2

WEAVER BOOS CONSULTANTS

LOG OF BORING NO. TMP-5B

Project Title: Turkey Creek Gas Probe Installation
Project No: 0120-72-11-55-01

Geologist: Ferbend
Driller: Groundwater Monitoring, Inc.

Boring Start Date: 10/15/2004 Northing: 722.94046 ft.
Boring End Date: 10/18/2004 Easting: 1180.61278 ft.
Ground Elevation: 717.94 ft.

Remarks: Dual Level Gas Probe Completion.

Depth (ft)	Samples	Graphic Log	Description	USCS	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/Ft	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Permeability (cm/s)	Well Detail
			Clayey Fill, dark brown, dry, plastic when moist, firm. 710.9											714.9
5			Clay, silty, gray, brown, dry, plastic, stiff with weathered sandy fragments and occasional calcite crystals. 707.9											
10			Clay, sandy, dark brown, gray with iron-stained sand seams (0.5" each), slightly moist, plastic, stiff. 701.9											706.9
15			Sand, brownish-red, slightly moist, poorly consolidated to unconsolidated, clayey seams common, very fine grained. 698.4											
20			Sand, silty, medium gray, moist, dense, very fine grained, poorly sorted, with few clayey sand laminations. 694.9											696.9
			Clay, silty, dark gray, dry, hard, fat, plastic, with few silty sand laminations; 693.9											
25			- Very hard 6" siltstone lens. 692.9											692.9
			Clay, brownish gray, slightly moist, very thin, very fine grained, 0.5" sand laminations.											691.9
			Shale, clayey, dark brown gray, dry, slightly plastic, fat, hard. - Water at 28'. 684.9											
35			Shale, sandy, dark gray, dry with two moist, 0.5" sand seams, plastic, hard, with abundant shell and plant fragments, calcareous. 678.1											677.9

WELL_V2.2_PR_REV3 TURKEY CREEK.GPJ WEAVER BOOS.FW.GDT 11/10/04

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LOG OF BORING NO. TMP-5B

2009 THE CAREL CORPORATION

GROUNDWATER MONITOR WELL BORING LOGS

LOG OF MONITOR WELL NO. MW-28

Project Description: 2009 Monitor Well Installations

Location: Turkey Creek Landfill

Surface El.: 658.85 feet
Completion Depth: 35 feet
Date Boring Started: 10/19/209
Date Boring Completed: 10/20/209

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			CLAY, brown		Concrete from 0 to 2' bgs
5			SAND, red to brown, very fine to fine grained, subrounded, well sorted, unconsolidated, very moist		
10			Silty CLAY, yellow to brown and gray mixed layer with iron staining, moist		Bentonite grout from 2' to 19' bgs
15			Silty CLAY, yellow to brown with iron staining, very moist		
20			SAND, light brown, very fine grained, subrounded and well sorted, wet		Bentonite seal from 19' to 22' bgs
25			Sandy, Silty CLAY, red to yellow brown, very fine grained, subrounded, wet		20/40 Silica sand from 22' to 35' bgs 0.010" Slotted screen from 25' to 35' bgs
30			Silty SAND, yellow to brown gray, silt to fine grained, subrounded, wet		
35					
40					
45					
50					

STATE OF TEXAS
MICHAEL J. HULL
GEOLOGY
#1152
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael J. Hull
12/17/09

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/19/09	15.00
10/27/09	10.72

Remarks: 8 1/4 inch borehole diameter

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-28
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▽ Water level after drilling.

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 10/20/2009
Well Location: Latitude: 32°21'31.31"
Monitor Well Groundwater Gradient
Gradient: Upgradient: ____ Downgradient: X

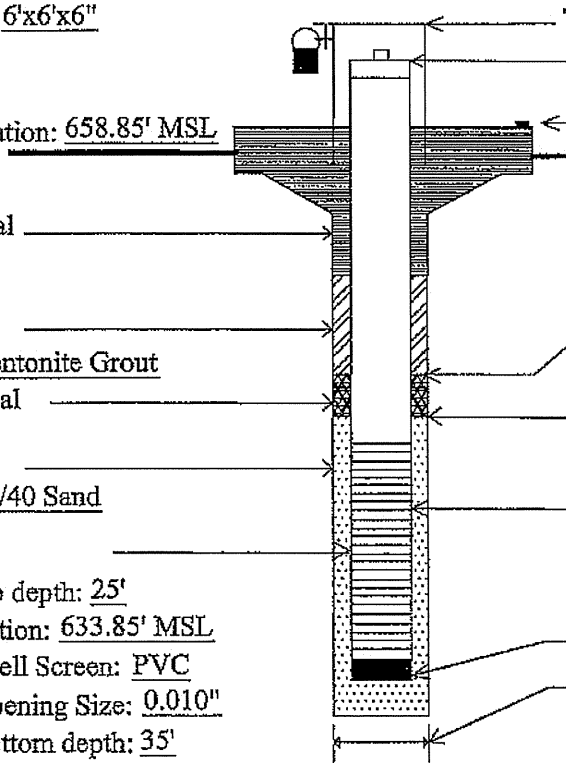
MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-28
Date of Monitor Well Development: 10/27/2009
Longitude: -97°12'14.39"
Monitor Well Driller
Name: Roddy Quails
License No.: 3121

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 647.70'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing
Concrete surface pad dimensions: 6'x6'x6"



Top of Protective Collar Elevation: 662.06' MSL
Top of Well Casing Elevation: 661.66' MSL
Surface elevation: 658.85' MSL
Surveyors Pin Elevation: 658.86' MSL
Concrete Seal Depth: 2.0'
Bentonite Seal Top Depth: 19' Elevation: 639.85' MSL
Casing seal material: Bentonite Grout
Bentonite Seal
Filter Pack Top Depth: 22' Elevation: 636.85' MSL
Filter pack Material: 20/40 Sand
Well casing Type: PVC Size (diameter): 4" Schedule or Thickness: Sch. 40
Well screen
Screen top depth: 25'
Top Elevation: 633.85' MSL
Type of well Screen: PVC
Screen Opening Size: 0.010"
Screen Bottom depth: 35'
Bottom Elevation: 623.85' MSL
Bottom Cap Depth: 35'
Borehole Diameter: 8 1/4"

TCEQ-10308

STATE OF TEXAS
MICHAEL J. HULL
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LICENSED
PROFESSIONAL GEOSCIENTIST

Michael J Hull
12/17/09

LOG OF MONITOR WELL NO. MW-29

Project Description: 2009 Monitor Well Installations

CAREL CORPORATION

Location: Turkey Creek Landfill

Surface El.: 659.24 feet
Completion Depth: 36.5 feet
Date Boring Started: 10/19/2009
Date Boring Completed: 10/20/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			Silty CLAY, red to brown		Concrete from 0' to 2' bgs
			Silty SAND, red to orange, silt to very fine grained, subrounded and moderately well sorted, wet		
5			CLAY, gray to green, moist		
			GRAVEL, red, yellow to brown, angular, poorly sorted		
			SILT, light yellow to tan, dry, red to brown with iron staining, silica cement hard at 9 feet below ground surface		
10			SAND, yellow to brown and tan, silt to fine grained, moderately well sorted and subrounded, wet		
15			wet at 16 feet below ground surface		Bentonite grout from 2' to 18.5' bgs
20			SILT, medium gray, slightly moist		Bentonite seal from 18.5' to 23.5' bgs
			CLAY, medium gray, hard drilling, dry		
			SAND/SILT, medium gray silt to very fine grained, subrounded and well sorted, wet		
25			hard drilling at 27 feet below ground surface		
			CLAY, silty, medium gray to gray, hard drilling, dry		
30			wet at 30 feet below ground surface		20/40 Silica sand from 23.5' to 36.5' bgs
			SAND, gray, silt to very fine grained, subrounded, moderately sorted, lignitic, wet		0.010" Slotted screen from 26.5' to 36.5' bgs
35			Silty CLAY, medium gray, lignitic, moist hard drilling at 35 feet below ground surface		
40					
45					
50					

STATE OF TEXAS
MICHAEL J. HULL
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#1152
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PROFESSIONAL GEOSCIENTIST

Michael J. Hull
12/17/09

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/19/09	21.00
10/28/09	12.76

Remarks: 8 1/4 inch borehole diameter

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-29
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 10/20/2009
Well Location: Latitude: 32°21'34.08"
Monitor Well Groundwater Gradient
Gradient: Upgradient: _____ Downgradient: X

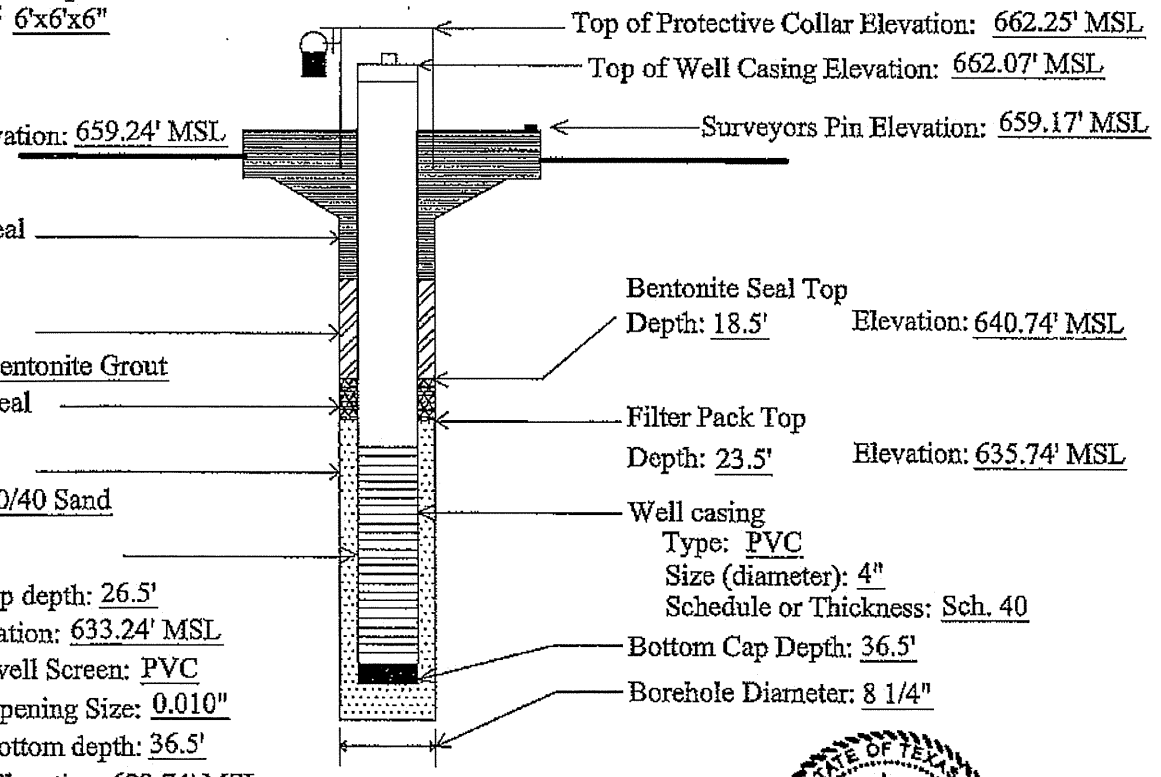
MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-29
Date of Monitor Well Development: 10/27/2009
Longitude: -97°12'08.62"
Monitor Well Driller Name: Roddy Quails
License No.: 3121

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 646.48'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing
Concrete surface pad dimensions: 6'x6'x6"



TCEQ-10308

STATE OF TEXAS
MICHAEL J. HULL
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12/17/09

LOG OF MONITOR WELL NO. MW-30

Project Description: 2009 Monitor Well Installations

CAREL

Location: Turkey Creek Landfill

Surface El.: 662.71 feet
Completion Depth: 42 feet
Date Boring Started: 10/20/2009
Date Boring Completed: 10/20/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			Silty CLAY, dark brown		Concrete from 0' to 2' bgs
5			CLAY, yellow to brown, fissile		
			gray to brown, slightly moist at 7 feet bgs		
10			Silty CLAY, yellow to brown, limonite and iron staining, rusty limonite layers, slightly moist		
			light gray to gray tan, slightly moist at 13 feet bgs		
15			yellow to brown with rusty brown layers, dry at 16 feet bgs		Bentonite grout from 2' to 25' bgs
20			CLAY, dark gray with fossil shell fragments, chert, drilling hard, dry		
			chert, 6" layer at 24 feet bgs		
25			SILT, yellow to orange brown with iron limonite stain, slightly moist light gray to gray white, sorted and friable, moist at 25 feet bgs		Bentonite seal from 25' to 30' bgs
30			Silty CLAY, gray brown, moist		
35			Silty SAND, light gray, sand is very fine grained, subrounded and well sorted, wet		20/40 Silica sand from 30' to 42' bgs 0.010" Slotted screen from 32' 42' bgs
40			SHALE, dark gray to black with laminated shale, hard, dry hard drilling, bit refusal at 40 feet bgs		
45					
50					

STATE OF TEXAS
MICHAEL J. HULL
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PROFESSIONAL GEOSCIENTIST

Michael J. Hull
12/17/09

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/20/09	33.00
10/28/09	16.12

Remarks: 8 1/4 inch borehole diameter

LOG OF MONITOR WELL NO. MW-30
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▼ Water level after drilling.

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 10/20/2009
Well Location: Latitude: 32°21'33.46"
Monitor Well Groundwater Gradient
Gradient: Upgradient: _____ Downgradient: X

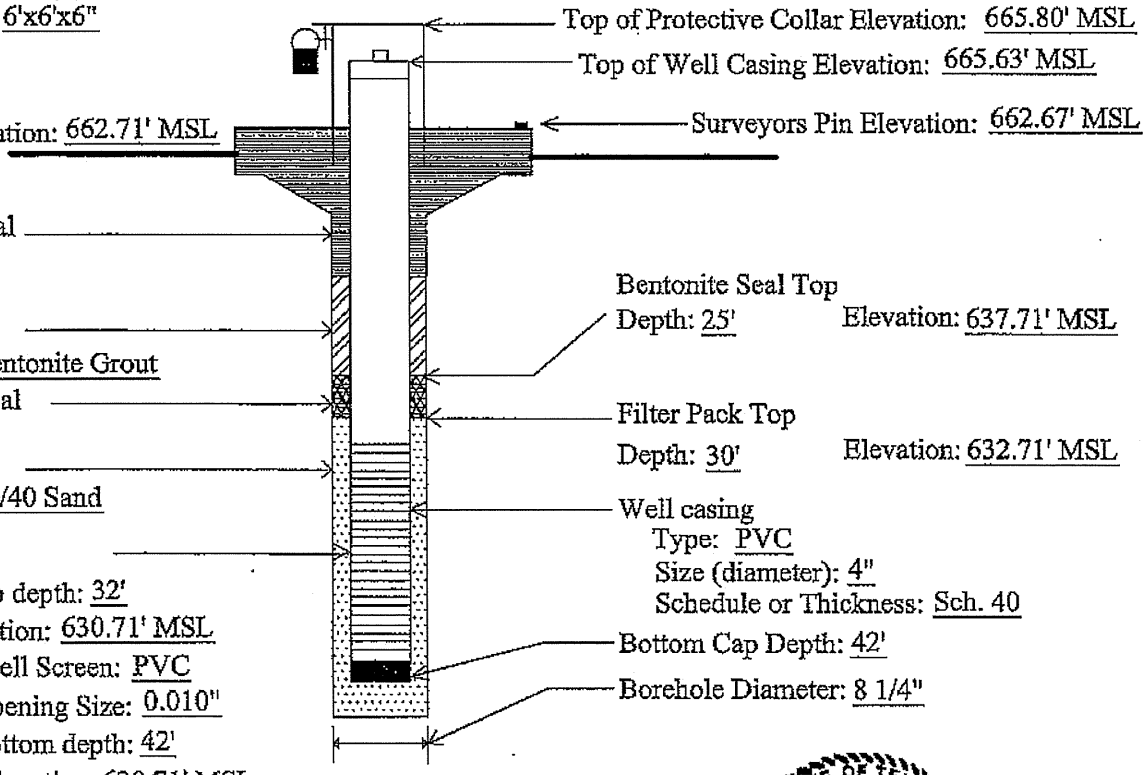
MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-30
Date of Monitor Well Development: 10/27/2009
Longitude: -97°11'59.47"
Monitor Well Driller
Name: Roddy Quails
License No.: 3121

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 646.59'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing
Concrete surface pad dimensions: 6'x6'x6"



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STATE OF TEXAS
MICHAEL J. HULL
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Michael Hull
12/17/09

LOG OF MONITOR WELL NO. MW-31

Project Description: 2009 Monitor Well Installations

CAREL CORPORATION

Location: Turkey Creek Landfill

Surface El.: 688.37 feet
Completion Depth: 65 feet
Date Boring Started: 10/5/2009
Date Boring Completed: 10/5/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			CLAY, silty brown to gray, moist		Concrete from 0' to 2' bgs
			GRAVEL, rusty brown, poorly sorted, moist		
5			CLAY, gray to brown		
			Silty CLAY, gray to brown, moist		
10			SILT, light gray, some limonite, moist		
			Silty SAND, yellow to brown, rusty, very fine grained, subrounded and moderately well sorted, moist		
15			SAND, light gray, very fine grained, well rounded and well sorted, moist		
			sand is yellow orange to brown, fine grained, subrounded and moderately well sorted with some lignite, moist to wet at 18 feet below ground surface		
20			GRAVEL, dark brown, iron stained, wet		
			CLAY, slightly silty, light gray, moist		
			SILT, light gray with some clay and with some lignite stringers, moist, perched water zone at 25' bgs		
25			SAND, light brown to tan, fine grained and subrounded, moderately well sorted, wet		
30			Silty CLAY, light gray with some lignite stringers, moist to dry silty clay and clay mixed, medium gray, wet to moist at 31 feet below ground surface		Bentonite grout from 2' to 48' bgs
35					
40			CLAY, dark gray, shale like partings, dry		
			clay shale, black and gray to black at 43 below ground surface dark gray to gray black with fossil fragments at 44 feet below ground surface medium gray, gray to green, dry at 45 feet below ground surface		
45					
50					

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations

Date	Depth
10/5/09	26.00
10/27/09	42.15
10/5/09	51.00

Remarks: 8 1/4 inch borehole diameter

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-31
PAGE 1 of 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▼ Water level after drilling.

LOG OF MONITOR WELL NO. MW-31

Project Description: 2009 Monitor Well Installations

CAREL CORPORATION

Location: Turkey Creek Landfill

Surface El.: 688.37 feet
Completion Depth: 65 feet
Date Boring Started: 10/5/2009
Date Boring Completed: 10/5/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
55			clay is medium light gray at 50 feet below ground surface		Bentonite seal from 48' to 53' bgs
			SAND, gray, fine grained, subrounded and well sorted, wet		
			SILT, light gray, slightly moist		
60			SAND, light gray, very fine to fine grained, subrounded and moderately well sorted, wet		20/40 Silica sand from 53' 65' bgs
					0.010" Slotted screen from 55' to 65' bgs
65			Sandy SHALE, medium gray, sand is very fine grained and well sorted, wet		
70					
75					
80					
85					
90					
95					
100					

STATE OF TEXAS
MICHAEL J. HULL
GEOLOGY
#1152
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PROFESSIONAL GEOLOGIST

Michael J. Hull
12/17/09

Drilling Contractor:	Strata Core Drilling
Drilling Method:	HSA
Sampling Method:	Continuous
Geologist/Engineer:	Michael Hull
Project No.:	09-03-30

Groundwater Observations	
Date	Depth
10/5/09	25.00
10/27/09	42.15
10/5/09	51.00

Remarks: 8 1/4 inch borehole diameter

LOG OF MONITOR WELL NO. MW-31
PAGE 2 of 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▽ Water level after drilling.

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 10/05/2009
Well Location: Latitude: 32°21'28.03"
Monitor Well Groundwater Gradient
Gradient: Upgradient: ____ Downgradient: X

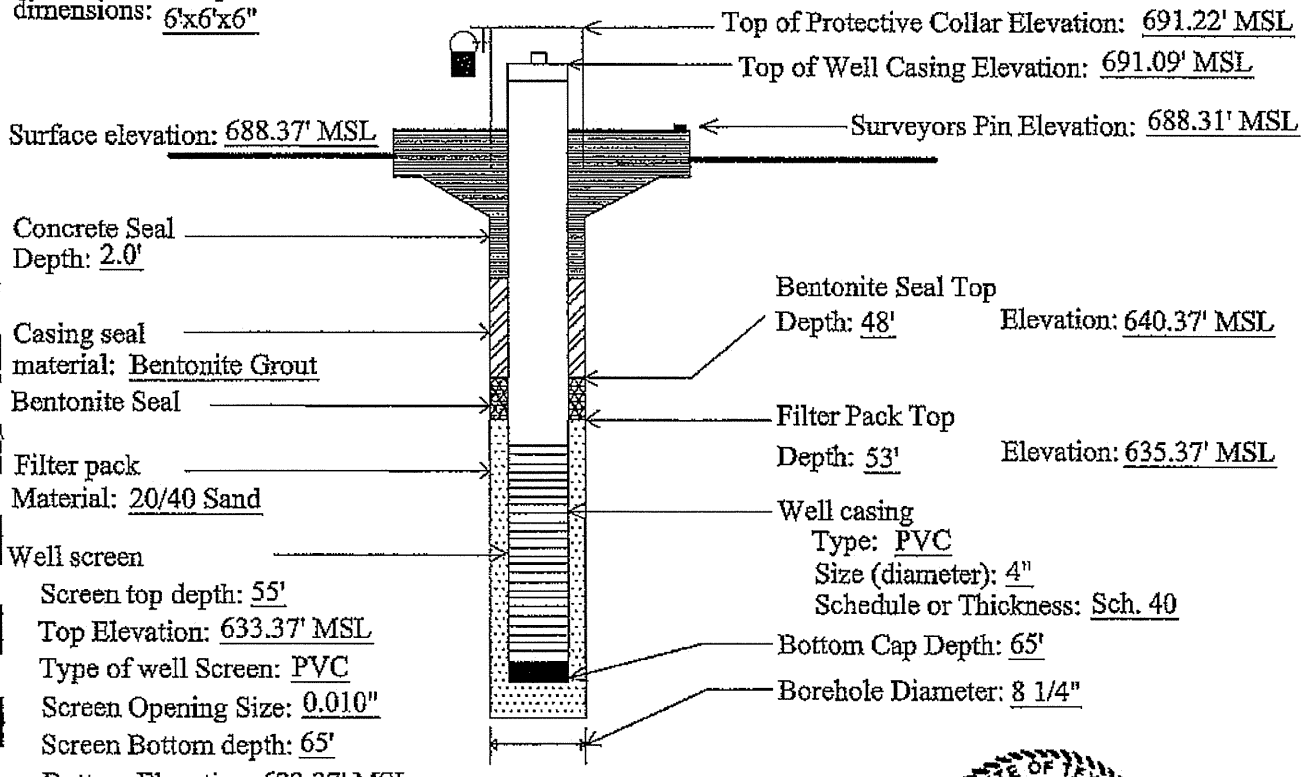
MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-31
Date of Monitor Well Development: 10/27/2009
Longitude: -97°11'58.89"
Monitor Well Driller
Name: Roddy Quails
License No.: 3121

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 646.22'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing
Concrete surface pad dimensions: 6'x6'x6"



TCEQ-10308

STATE OF TEXAS
MICHAEL J. HULL
GEOLOGY
#152
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael Hull
12/17/09

LOG OF MONITOR WELL NO. MW-32

Project Description: 2009 Monitor Well Installations

Location: Turkey Creek Landfill

Surface El.: 695.28 feet
Completion Depth: 70 feet
Date Boring Started: 10/7/2009
Date Boring Completed: 10/7/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			Silty CLAY, brown with gravel/ fill material to build pad up		Concrete from 0' to 2' bgs
5			SILT, light gray		
			CLAY, slight silty		
10			SILT, gray friable		
			CLAY, gray		
15					
			SILT, gray to medium gray, friable wet at 20 feet bgs - perched water zone		▽
20					
25			SAND, brown, very fine grained, subrounded and moderately well sorted, wet gray to brown and very fine grained, subrounded, moderately well sorted with rusty iron staining mixed in sand, wet at 26 feet below ground surface		
30			CLAY, tan, wet silty, tan and gray mixed, dry at 30 feet bgs medium gray and firm, dry at 32 feet bgs		
35			silty and medium gray, wet at 36 feet bgs fissle from 40 to 43' bgs, dry at 37 feet bgs		
40			39 feet to 40 feet below ground surface fissle, slighty moist		
45			LIMESTONE, gray brown		
			Silty CLAY, gray to green, fissile, moist		▼ Bentonite grout from 2' to 53' bgs
50			SILT and CLAY with shale intermixed, light gray, dry		

MW WITH WELL DETAILS AND LOGS\ TURKEY CREEK.GPJ CAREL.GDT 12/17/09

Drilling Contractor:	Strata Core Drilling
Drilling Method:	HSA
Sampling Method:	Continuous
Geologist/Engineer:	Michael Hull
Project No.:	09-03-30

Groundwater Observations	
Date	Depth
10/7/09	20.00
10/7/09	51.00
10/27/09	46.57

Remarks: 8 1/4 inch borehole diameter

LOG OF MONITOR WELL NO. MW-32
PAGE 1 of 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF MONITOR WELL NO. MW-32

Project Description: 2009 Monitor Well Installations

CAREL CORPORATION

Location: Turkey Creek Landfill

Surface El.: 695.28 feet
Completion Depth: 70 feet
Date Boring Started: 10/7/2009
Date Boring Completed: 10/7/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
55			SILT, inter-layered with clay, light gray, some lignite along bedding planes, moist		
			CLAY, medium gray		Bentonite seal from 53' to 58' bgs
			SILTSTONE, medium gray and gray black with lignite and carbonite wood fragments, silicified, dry		
60					
			Silt and CLAY mixed layers, wet		20/40 Silica sand from 58' to 70' bgs
65					
			SILT, light gray, wet		0.010" Slotted screen from 60' to 70' bgs
70					
75					
80					
85					
90					
95					
100					

STATE OF TEXAS
MICHAEL J. HULL
GEOLOGY
#1152
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael J. Hull

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/7/09	20.00
10/7/09	51.00
10/27/09	46.57

Remarks: 8 1/4 inch borehole diameter

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▼ Water level after drilling.

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-32
PAGE 2 of 2

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 10/07/2009
Well Location: Latitude: 32°21'16.90"
Monitor Well Groundwater Gradient
Gradient: Upgradient: _____ Downgradient: X

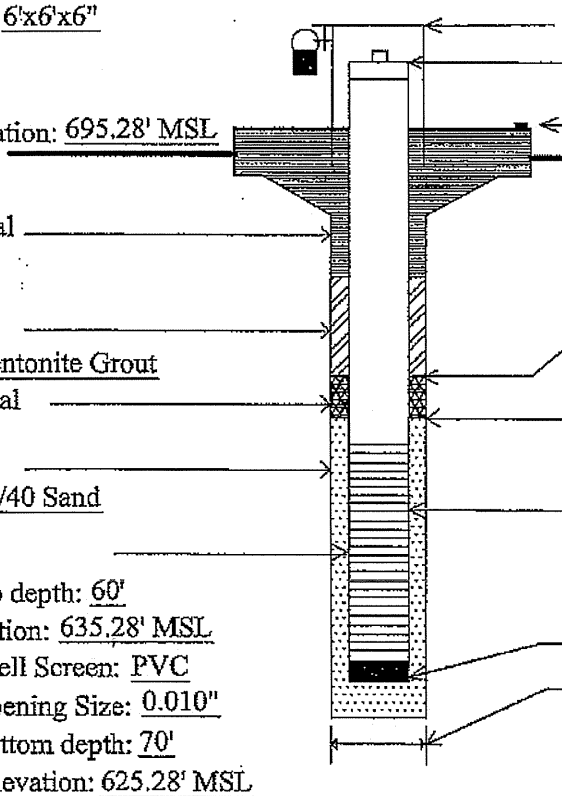
MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-32
Date of Monitor Well Development: 10/27/2009
Longitude: -97°11'56.82"
Monitor Well Driller
Name: Roddy Quails
License No.: 3121

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 651.61'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing
Concrete surface pad dimensions: 6'x6'x6"



Top of Protective Collar Elevation: 698.35' MSL
Top of Well Casing Elevation: 698.18' MSL
Surveyors Pin Elevation: 695.26' MSL
Surface elevation: 695.28' MSL
Concrete Seal Depth: 2.0'
Casing seal material: Bentonite Grout
Bentonite Seal
Bentonite Seal Top Depth: 53' Elevation: 642.28' MSL
Filter pack
Material: 20/40 Sand
Filter Pack Top Depth: 58' Elevation: 637.28' MSL
Well screen
Screen top depth: 60'
Top Elevation: 635.28' MSL
Type of well Screen: PVC
Screen Opening Size: 0.010"
Screen Bottom depth: 70'
Bottom Elevation: 625.28' MSL
Well casing
Type: PVC
Size (diameter): 4"
Schedule or Thickness: Sch. 40
Bottom Cap Depth: 70'
Borehole Diameter: 8 1/4"

TCEQ-10308

STATE OF TEXAS
MICHAEL J. HULL
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#1152
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael Hull
12/17/09

LOG OF MONITOR WELL NO. MW-33

Project Description: 2009 Monitor Well Installations

Location: Turkey Creek Landfill

Surface El.: 693.36 feet
Completion Depth: 65 feet
Date Boring Started: 10/6/2009
Date Boring Completed: 10/7/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
0			SAND, orange to brown, silt to fine grained, subrounded and moderately well sorted, moist		Concrete from 0' to 2' bgs
5					
			SILT, light gray to white, moist		
			CLAY, light gray to white, moist		
10			SILT, light gray to white, wet		
			Silty CLAY, light gray to white, moist to wet		
15			SILT, yellow to orange brown with iron staining, wet light gray to gray brown, moist to wet at 15 feet bgs		
			CLAY/SILT, light gray and yellow to orange mixed, slightly moist		
20			CLAY, slightly silty, gray and green, dry fissile from 22 feet to 24 feet bgs		
25			fossil clam shells from 28 to 30 feet bgs		
30			Silty CLAY, gray to green with shale partings and fossil shells, fissile		
35			lignite and carbon wood fragments at 35 feet bgs		Bentonite grout from 2' to 48' bgs
				▼	
40			Silty SAND, light gray to green, very fine grained and subrounded, moderately well sorted, moist to slightly wet		
45			Clayey SILT, light gray to green with some lignite wood fragments, moist		
50					

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/28/09	38.80
10/7/09	52.00

Remarks: 8 1/4 inch borehole diameter

MW WITH WELL DETAILS AND LOGO TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-33
PAGE 1 of 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▼ Water level after drilling.

LOG OF MONITOR WELL NO. MW-33

Project Description: 2009 Monitor Well Installations

CAREL CORPORATION

Location: Turkey Creek Landfill

Surface El.: 693.36 feet
Completion Depth: 65 feet
Date Boring Started: 10/6/2009
Date Boring Completed: 10/7/2009

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Monitor Well Construction Details	Monitor Well Description
55			Silty SAND, gray to green, very fine grained and subrounded, moderately well sorted, wet		Bentonite seal from 48' to 53' bgs
			CLAYEY silt, gray to green, hard drilling		20/40 Silica sand from 53' to 65' bgs
60			Silty SAND, gray to green, fine grained and subrounded, moderately well sorted, wet		0.010" Slotted screen from 55' to 65' bgs
			Silty CLAY, gray to green		
			Silty SAND, gray to green, fine grained and subrounded, moderately well sorted, wet		
65			Silty CLAY, gray to green		
70					
75					
80					
85					
90					
95					
100					

STATE OF TEXAS
MICHAEL J. HULL
GEOLOGY
#152
LICENSED
PROFESSIONAL GEOSCIENTIST

Michael J. Hull
12/17/09

Drilling Contractor: Strata Core Drilling
Drilling Method: HSA
Sampling Method: Continuous
Geologist/Engineer: Michael Hull
Project No.: 09-03-30

Groundwater Observations	
Date	Depth
10/28/09	36.80
10/7/09	52.00

Remarks: 8 1/4 inch borehole diameter

MW WITH WELL DETAILS AND LOGS TURKEY CREEK.GPJ CAREL.GDT 12/17/09

LOG OF MONITOR WELL NO. MW-33
PAGE 2 of 2

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▽ Water level at end of drilling.
▼ Water level after drilling.

MONITORING WELL DATA SHEET

Permitee or Site Name: Turkey Creek Landfill
County: Johnson County
Date of Monitor Well Installation: 09/07/2009
Well Location: Latitude: 32°21'08.68"
Monitor Well Groundwater Gradient
Gradient: Upgradient: _____ Downgradient: X

MSW Permit No.: 1417B
Monitor Well I.D. No.: MW-33
Date of Monitor Well Development: 10/28/2009
Longitude: -97°12'04.14"
Monitor Well Driller
Name: Roddy Quails
License No.: 3121

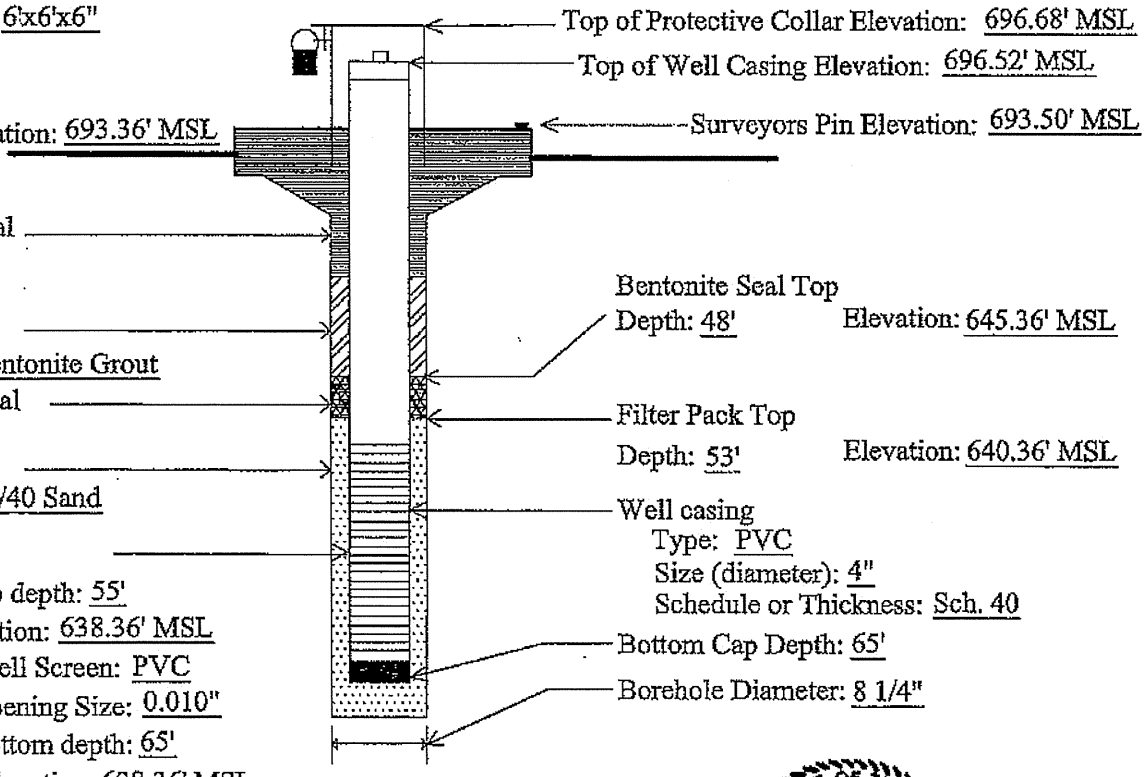
Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to the nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2" diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommended).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Michael Hull
Static Water Level Elevation (with respect to MSL) after Well Development: 656.56'
Name of Geologic Formation(s) in which Well is completed: Woodbine

Type of locking device: Padlock
Type of Well Casing Protection: 4"x4"x5' Steel Casing

Concrete surface pad dimensions: 6'x6'x6"



TCEQ-10308

STATE OF TEXAS
MICHAEL J. HULL
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Michael J. Hull
12/17/09

2012 THE CAREL CORPORATION

BORING LOGS

LOG OF BORING NO. B9-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 683,202 feet MSL
Completion Depth: 45 feet
Date Boring Started: 4/23/2012
Date Boring Completed: 4/23/2012

Northing: -263.69
Easting: 914.19

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			SHALE, dark grayish black, dry						
5			silty and fissile in parts from 5 to 17 feet below ground surface						
10				1.4E-8	116	59	24	35	99.4
15									
20			dark grayish black with grayish green, some very fine grained pyrite and carbon wood fragments present, fossiliferous						
25			SILT, light gray to medium gray, dry, friable						
30			SHALE, grayish green, dry, fissile						
			SILT, medium gray, moist to wet, friable						
35			SHALE AND SILT, medium gray, moist to wet, interlayered and somewhat friable						
40			▽						
45			SAND, medium gray, well sorted, rounded, very fine to fine grained, wet						
50									

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
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PROFESSIONAL GEOSCIENTIST
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA
Sampling Method: Continuous
Geologist: Michael J. Hall, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/23/12	640.202

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 11 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 6/11/12

LOG OF BORING NO. B9-1
PAGE 1 of 1

*The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B9-2

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 678.694 feet MSL
Completion Depth: 45 feet
Date Boring Started: 4/19/2012
Date Boring Completed: 4/19/2012
Northing: -753.52
Easting: 934.12

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			SILTY CLAY, dark gray, dry						
5			SHALE, dark grayish black to medium gray, dry						
10				5.7E-9	109	58	23	35	99.9
15									
20			very fine grained pyrite along bedding planes from 20 to 24 feet below ground surface						
25			slightly silty and medium to light gray from 24 to 27 feet below ground surface						
30			SILT, light greenish gray, dry to slightly moist, very friable						
35			SHALE AND SILT, light gray to medium gray, moist to wet, interlayered						
40			slightly moist at 40 feet below ground surface						
45			SAND, light gray, well sorted, rounded, fine to medium grained, wet						
50									

STATE OF TEXAS
KEVIN T. CAREL
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#960
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PROFESSIONAL GEOSCIENTIST

Drilling Contractor: StrataCore
Drilling Method: HSA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/19/12	636.694

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 12 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 05/11/12

LOG OF BORING NO. B9-2
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B10-1

Project Description: April 2012 Borings

CAREL Consultants

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 717.064 feet MSL
Completion Depth: 90 feet
Date Boring Started: 4/17/2012
Date Boring Completed: 4/17/2012

Northing: -162.45
Easting: 1293.10

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 40 feet below ground surface. No log.						
40			CLAY, dark reddish brown, dry						
45			SILTY SAND, reddish brown, well sorted, rounded, very fine grained, dry silty and friable with some very fine grained pyrite from 42 to 48 feet below ground surface						
50			SHALE, dark gray to light gray, dry fissile from 48 to 53 feet below ground surface very hard drilling, fissile with chert nodules from 53 to 57 feet below ground surface some thin calcareous seams from 57 to 58 feet below ground surface silty with fossils and very fine grained pyrite from 58 to 60 feet below ground surface	7.8E-8	116	41	15	26	70.4
60			fossiliferous with some pyrite and carbon wood fragments present from 63 to 66 feet below ground surface slightly silty with some thin glauconitic sheets from 66 to 68 feet below ground surface	1.9E-9	117	57	21	36	98.1
70			SILTY SAND, light gray to medium gray, moderately well to well sorted, rounded, very fine grained, moist to wet, some thin shale seams present						
75			SHALE AND SILT, light gray to dark gray, moderately well sorted, rounded, dry to slightly moist, some very fine sand, interlayered						
85			SILTY SAND, light gray to dark grayish black, well sorted, rounded, very fine grained, wet, some thin shale seams present						
90			SHALE, dark grayish black						
95			SAND, light gray, well sorted, rounded, very fine to fine grained, wet						

STATE OF TEXAS
KEVIN T. CAREL
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#960
LICENSED
PROFESSIONAL GEOSCIENTIST
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/17/12	647.064
04/17/12	633.064

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube samples at 53 and 65 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 6/5/12

LOG OF BORING NO. B10-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B10-2

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 709.922 feet MSL
Completion Depth: 75 feet
Date Boring Started: 4/18/2012
Date Boring Completed: 4/18/2012

Northing: -639.06
Easting: 1339.47

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 40 feet below ground surface. No log.						
40			SHALE, grayish green to dark grayish black, dry, tight and hard - slow drilling some chert nodules and thin silt layers from 40 to 50 feet below ground surface						
50			fossiliferous with some very fine grained pyrite and carbon wood fragments present from 52 to 55 feet below ground surface silty and moist at 55 feet below ground surface	3.0E-8	115	33	15	18	96.6
60			SILT, light gray, well sorted, rounded, moist to dry						
60			SHALE AND SILT, light gray and medium gray, dry, interlayered, hard drilling						
70			SILT, light gray, well sorted, rounded, slightly moist						
70			SAND, light gray and brown, well sorted, rounded, fine grained, wet						
75			SHALE, medium gray and light gray						
75			SAND, light gray, well sorted, rounded, fine grained, wet						
80									

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/18/12	638.922
04/18/12	636.922

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 50 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 05/1/12

LOG OF BORING NO. B10-2
PAGE 1 of 1

(The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B11-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 714.744 feet MSL
Completion Depth: 95 feet
Date Boring Started: 4/23/2012
Date Boring Completed: 4/23/2012

Northing: -414.77
Easting: 1655.13

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Penetration Blow Counts Three 6" Intervals Max. 50 Blows	Unit Weight Dry lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 45 feet below ground surface. No log.							
45			SHALEY SILT, medium gray with dark gray, moist							
50			fissile from 50 to 55 feet below ground surface							
55			SHALE, medium gray to dark grayish black, dry slightly silty from 50 to 62 feet below ground surface grayish green from 55 to 62 feet below ground surface fossiliferous from 57 to 65 feet below ground surface very fissile from 62 to 65 feet below ground surface	1.1E-8	24-34-50 (84) 50	117	61	22	39	99.6
65			fossiliferous with carbon wood fragments from 66 to 68 feet below ground surface	2.2E-9		117	56	23	33	95.6
70			SILT, medium gray, wet friable from 71 to 72 feet below ground surface							
75			SILTY SHALE, medium gray							
80			SHALE AND SILT, medium gray, moist to wet, interlayered fissile at 79 feet below ground surface							
85			SILTY SAND, medium gray, wet							
			SILTY SHALE, medium gray, wet							
90			SAND, gray, moderately well sorted, rounded, very fine to fine grained, wet							
95			SHALE AND SILT, medium gray, slightly moist, interlayered							
100			SAND, medium gray and light gray, moderately well sorted, rounded, very fine to fine grained, slightly moist							
105			SHALE AND SILT, medium gray to dark gray, interlayered							

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/20/12	646.744
04/20/12	628.744

Remarks: CME-75 rig with 8.25 inch diameter boring. Split spoon sample at 55 feet below ground surface. Shelby tube sample at 65 feet below ground surface.

TURKEY CREEK BORINGS_TURKEY CREEK.GPJ_CAREL2.GDT 05/1/12

LOG OF BORING NO. B11-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B12-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 690.883 feet MSL
Completion Depth: 80 feet
Date Boring Started: 4/19/2012
Date Boring Completed: 4/19/2012

Northing: -311.85
Easting: 2058.82

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 25 feet below ground surface. No log.						
25			SAND, reddish brown, well sorted, rounded, medium grained, wet						
			silty from 28 to 30 feet below ground surface						
30			SHALE, light gray to dark grayish black, dry						
			fissile from 30 to 35 feet below ground surface						
35			fossiliferous from 36 to 40 feet below ground surface	7.9E-9	110	61	21	40	99.8
			fossiliferous from 37 to 39 feet below ground surface						
40			fissile from 40 to 48 feet below ground surface						
			slightly silty from 42 to 48 feet below ground surface						
45			silty and medium grayish green from 48 to 49 feet below ground surface						
50			SILTY SAND, medium grayish green, moderately well sorted, rounded, very fine grained, slightly moist						
			No recovery from core barrel						
55			SILT, grayish green, slightly moist						
60			SILTY SHALE, medium gray, fissile						
			SILTY SAND, light grayish green, well sorted, rounded, very fine grained, wet to moist						
65			SHALE AND SILT, light gray and medium gray, fissile, interlayered, carbon wood fragments at 70 feet below ground surface						
70									
75			SHALE, grayish black, fossiliferous with carbon wood fragments present						
80			SAND, medium gray, moderately well sorted, rounded, fine grained, wet						
85									

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
6-14-12

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 6/11/12

Drilling Contractor: StrataCore	
Drilling Method: HSA/RFA	
Sampling Method: Continuous	
Geologist: Michael J. Hull, P.G.	
Project No.: 12-02-38	

Groundwater Observations	
Date	Elevation (ft. MSL)
04/19/12	675.883
04/19/12	629.883
04/19/12	611.883

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 35 feet below ground surface.

LOG OF BORING NO. B12-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▽ Water level after drilling.

2013 THE CAREL CORPORATION

LANDFILL GAS PROBE BORING LOG

LOG OF GAS PROBE NO. GMP-9A

Project Description: GMP-9A Installation

CAREL CORPORATION

Location: Turkey Creek Landfill
Top of PVC El.: 707.22 feet MSL
Surface El.: 704.1 feet MSL
Completion Depth: 36 feet
Date Boring Started: 6/26/2013
Date Boring Completed: 6/26/2013

Northing: -1362.18
Easting: 1585.34

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Gas Probe Construction Details	Gas Probe Description
0			SAND, reddish brown, fine grained, slightly moist to dry		Concrete from surface to 2' bgs
					Bentonite chips from 2' bgs to 4' bgs
5					Bentonite granules from 4' bgs to 5' bgs
10			orange-red at 10-feet		20/40 Silica sand filter pack from 5' bgs to 35.5' bgs
15					
20			moist, some clay at 20-feet		
			wet at 22-feet		
25					0.01" Slotted screen from 5' bgs to 35' bgs
			CLAY, gray, hard		
30					
35					6" of boring caved-in

GAS PROBE - B&W TURKEY CREEK.GPJ CAREL2.GDT 9/11/13

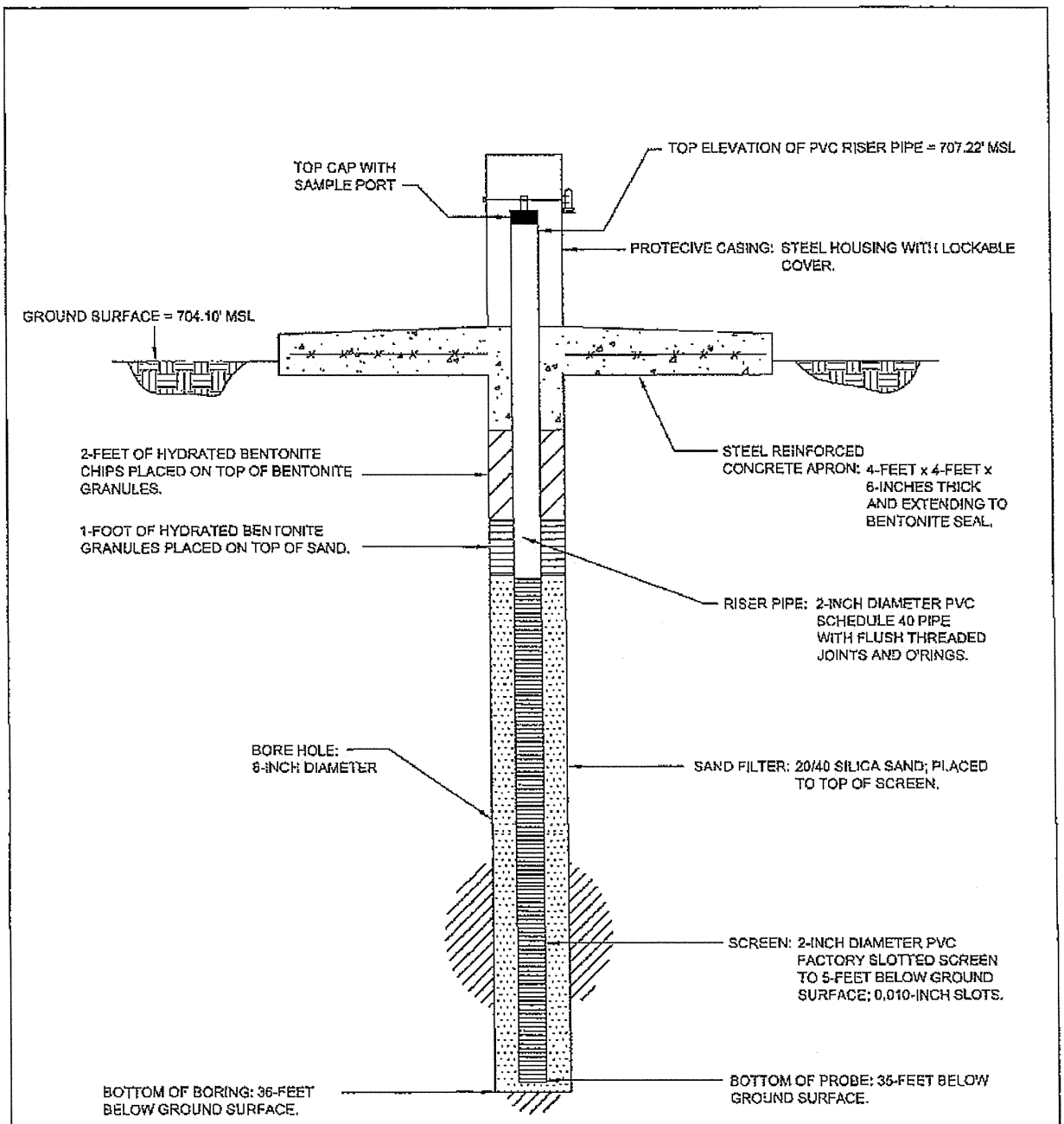
Drilling Contractor: Roddy Qualls Env. Drilling
Drilling Method: SFA
Sampling Method: Continuous
Geologist: Steven J. Wimmer
Project No.: 13-05-23

Groundwater Observations	
Date	Depth

Remarks: 8-inch diameter boring

LOG OF GAS PROBE NO. GMP-9A
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual



NOT TO SCALE

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

GAS MONITORING PROBE GMP-9A CONSTRUCTION DIAGRAM

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE: July 12, 2013
FILENAME:
DRAWN BY: SJW
DRAFTED BY: SJW

2021 WEAVER CONSULTANTS GROUP

BORING LOGS

Weaver Consultants Group

KEY TO LITHOLOGIC LOGS
TURKEY CREEK LANDFILL
2021 SUBSURFACE INVESTIGATION

SAMPLING METHODS:

Symbol:	Sampling Method:
U	Thin Walled Shelby Tube Sample
S	Split Spoon Barrel Sample
C	Split Core Barrel Sample
P	Pitcher Barrel Sample
A	Auger Sample
WR	Rotary Wash Sample

RELATIVE DENSITY OF COARSE GRAINED SOILS:

Penetration Resistance: (Blows/Foot)	Relative Density:
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
Over 50	Very Dense

CONSISTENCY OF FINE-GRAINED SOILS:

Unconfined Compressive Strength: (Tons per Square Foot)	Consistency:	Field Criteria:
Less than 0.25	Very Soft	Squeezes between fingers when fist is closed.
0.25 to 0.50	Soft	Easily molded by fingers.
0.50 to 1.00	Firm	Molded by strong pressure of fingers.
1.00 to 2.00	Stiff	Imprinted very slightly by finger pressure.
2.00 to 4.00	Very Stiff	Cannot imprint with finger pressure / can penetrate w/ pencil.
4.00 and Up	Hard	Imprinted only slightly by pencil point.

MOISTURE:

Description:	Criteria:
Dry	Absence of moisture.
Moist	Damp, but no visible water.
Wet	Very damp to visible water.

PLASTICITY

Description:	Criteria:
Non-plastic	1/8" Thread Can't Be Rolled.
Low	1/8" Thread Difficult to Roll / No Lump.
Medium	1/8" Thread Easy to Roll / No reroll / No Lump.
High	Long time to 1/8" Thread at Plastic Limit.

STRATIFICATION:

Description:	Thickness:
Massive Bedding	> 10 ft.
Very Thickly Bedded	3 ft. to 10 ft.
Thickly Bedded	1 ft. to 3 ft.
Moderately Bedded	3 in. to 1 ft.
Thinly Bedded	1.2 in. to 3 in.
Very Thinly Bedded	3/8 in. to 1.2 in.
Laminated	< 3/8 in.
No Visible Bedding	Not Visually Evident

SEDIMENTARY TEXTURES:

Description:	Definition:
Slickensides	Polished fracture surface seen in clay.
Fractures	Failure plane, commonly w/ mineralization.
Blocky	Angular lumps that resist further breakdown.
Brecciated	Angular fragments commonly due to faulting.
Friable	Consolidated material easily broken into small pieces
Weathered	Irregular discoloration and diminished soil structure.
Calcareous	Contains calcium carbonate, commonly as cement.
Interbedded	Indicates alternating layers of contrasting sediments.

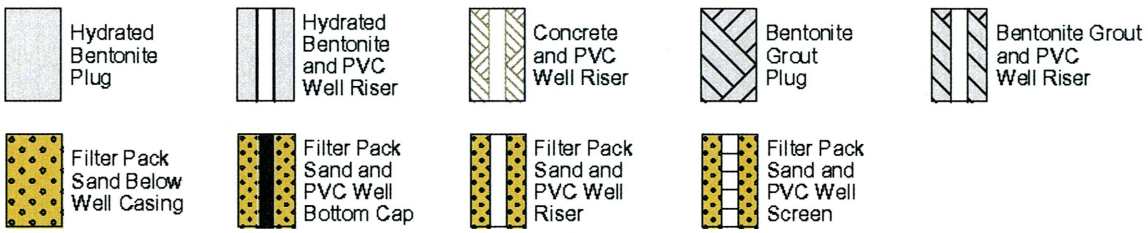
SUBSURFACE CONDITIONS:

The lithologic log soil and rock descriptions are based on visual field observations. The lithologic unit contacts shown on the logs indicate approximate boundaries between materials. The actual contacts may be gradational and vary between borehole locations. The visual/manual procedures used for the field classification of soils were performed in general accordance with ASTM Standard D-2488. Water level observations were made at the time of drilling and at subsequent times, as indicated. Future water levels may vary significantly from those indicated due to climatic factors, construction activity, or other factors.

LITHOLOGIC UNITS



PIEZOMETER AND PLUGGING DETAIL



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LOG OF BORING NO. PWCG-1

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/23/2021 Northing (State Plane): 6815354.23

Boring End Date: 8/24/2021 Easting (State Pane): 2367733.98

Ground Elevation at Time of Drilling: 673.85 ft-msl

Top of Well Casing Datum Elevation: 676.85 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 660.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 640.9 ft-msl

▼ = Static Potentiometric Surface Elevation: 651.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	U		SAND, silty, trace clay, moist, very stiff to hard, non-plastic, laminated, interbedded, reddish brown and light yellowish brown, with iron nodules, iron staining, and roots.		4.0									671.85
	U				>4.5									
				669.9										
5	U		SAND, clayey, silty, moist, hard, low plasticity, laminated, interbedded, light yellowish brown, with iron nodules, iron and manganese staining, and roots.		>4.5									
				667.9										
	U		SAND, trace silt, moist, hard, non-plastic, laminated, light yellowish brown and reddish brown, with iron and manganese staining, trace ironstone fragments, and trace roots.		>4.5									
				665.4										
	U		SAND, clayey, trace silt, moist, hard, low plasticity, laminated, interbedded, light yellowish brown, light gray, and reddish brown, with iron and manganese staining, trace ironstone fragments, and roots.		>4.5									
10				663.9										
	S		SAND, trace clay, moist, hard, non-plastic, laminated, interbedded, pale yellow and reddish brown, with iron staining.			28/50+								
	S					13/36/50+								
	S		- becomes wet and pale yellow to light yellowish brown below 13.0'.			16/36/44								
15	A		- with trace ironstone fragments below 15.0'.											658.85
	S			657.9		17/47/50+								
	S		CLAY, sandy, silty, wet, very stiff to hard, low to medium plasticity, laminated, interbedded, with iron staining.			8/22/36								
	S					12/16/17								
20	A			653.9										
	U		SAND, clayey, silty, wet, hard, low plasticity, laminated, interbedded, light yellowish brown and dark gray, with iron and manganese staining.											
	S			650.9		17/36/50+								
	S		SHALE, sandy, silty, dry, hard, plastic when moistened, laminated, interbedded, dark gray and light gray, fossiliferous.			20/36/41								

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Weaver Consultants Group

LOG OF BORING NO. PWCG-1

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

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▽ = First Water Encountered at Time of Drilling: 660.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 640.9 ft-msl

▼ = Static Potentiometric Surface Elevation: 651.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	C				>4.5		92	16	109.2	43	18	25		645.85
							9.53	17	113.3	46	19	27		
30			- becomes moist below 30.0'.											643.55
	C			640.9	>4.5									
			SAND, shaly, silty, wet, hard, non-plastic, laminated, interbedded, light gray, poorly consolidated, friable, calcareous.	639.4										
35			SANDSTONE, shaly, silty, wet, hard, non-plastic, laminated, interbedded, light gray, poorly consolidated, friable, calcareous.											
	C			633.9	>4.5									
40			SHALE, sandy, dry, hard, plastic when moistened, laminated, interbedded, dark gray and light gray with tan mottling, fossiliferous, with trace pyrite and manganese staining.											633.55
	C				>4.5									633.05
45														632.85
	C			623.9	>4.5									

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Boring End Date: 8/24/2021 Easting (State Pane): 2367733.98

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Top of Well Casing Datum Elevation: 676.85 ft-msl

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▽ = First Water Encountered at Time of Drilling: 660.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 640.9 ft-msl

▼ = Static Potentiometric Surface Elevation: 651.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
55	C		SHALE, silty, sandy, dry, hard, plastic when moistened, laminated to very thinly bedded, interbedded, dark gray and light gray, fossiliferous, with trace organics.		>4.5									
			- 2.0" siltstone seam at 54.5'.											
	C				>4.5									
60				613.9										613.85
			Total Borehole Depth = 60.0'											
65														
70														

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Weaver Consultants Group

LOG OF BORING NO. PWCG-2

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/6/2021 Northing (State Plane): 6814739.20

Boring End Date: 8/11/2021 Easting (State Pane): 2367642.31

Ground Elevation at Time of Drilling: 694.26 ft-msl

Top of Well Casing Datum Elevation: 697.22 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 672.8 ft-msl

▽ = Second Water Encountered at Time of Drilling: 659.8 ft-msl

▼ = Static Potentiometric Surface Elevation: 663.8 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Laboratory Tests	Groundwater Piezometer Construction Detail
	U		CLAY, sandy, silty, moist, very stiff, low to medium plasticity, no visible bedding, light yellowish brown, with iron and manganese staining, trace ironstones, and roots.		2.0											692.26
	U			690.3	2.0											
5	U		SAND, silty, clayey, moist, firm to very stiff, non-plastic to low plasticity, no visible bedding, yellowish brown with light gray mottling, with trace ironstone fragments, iron and manganese staining, and roots.		2.0											
	U				1.75											
	U		- becomes wet below 8.0'.		2.25											
10	U			683.8												
	U		CLAY, silty, sandy, moist, hard, low to medium plasticity, laminated, interbedded, with trace ironstone fragments and nodules, iron and manganese staining, and roots.		4.0											
	U			680.3	>4.5											
15	U		CLAY, sandy, silty, moist, hard, low to medium plasticity, laminated, interbedded, light gray, with iron and manganese staining.		>4.5											679.26
	U			678.3												
	A		SAND, silty, moist, hard, non-plastic, laminated, interbedded, light gray and black, with trace ironstone and chert fragments, and iron and manganese staining.			17/30/20									
	S															
20	A			674.3												
	S		SAND, clayey, silty, moist, hard, non-plastic, laminated, interbedded, light yellowish brown and light gray, with trace ironstone and chert fragments, and iron and manganese staining.	672.8												▽
	S		CLAY, silty, sandy, wet, hard, medium plasticity, laminated, interbedded, light yellowish brown and light gray, with iron and manganese staining.	671.3												
	S		SHALE, sandy, wet, hard, medium plasticity, laminated, interbedded, dark gray, with trace ironstone fragments, and iron and manganese staining.													

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LOG OF BORING NO. PWCG-2

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/6/2021 Northing (State Plane): 6814739.20

Boring End Date: 8/11/2021 Easting (State Pane): 2367642.31

Ground Elevation at Time of Drilling: 694.26 ft-msl

Top of Well Casing Datum Elevation: 697.22 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 672.8 ft-msl

▽ = Second Water Encountered at Time of Drilling: 659.8 ft-msl

▼ = Static Potentiometric Surface Elevation: 663.8 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	B													
	S			667.8										
			SANDSTONE, wet, hard, non-plastic, laminated, light yellowish brown, calcareous, fossiliferous, with ironstone fragments.	666.3										
	C		SHALE, with sandstone, moist, hard, non-plastic to low plasticity, laminated, interbedded, dark gray.	664.3	>4.5									
30			SHALE, sandy, moist, hard, low plasticity, laminated, interbedded, dark gray, friable.											
	C			659.8	>4.5									
35			SANDSTONE, shaly, moist to wet, hard, non-plastic to low plasticity, laminated, interbedded, crossbedded, light gray and dark gray.											659.26
	C		- becomes light yellowish brown below 38.5'.	654.3	>4.5									656.66
40			SAND, silty, trace clay, wet, hard, non-plastic, laminated, interbedded, light yellowish brown and light gray, poorly consolidated, with iron staining.											
	C			648.3	>4.5									
45			SANDSTONE, shaly, silty, moist, hard, non-plastic, laminated, interbedded, crossbedded, light gray and dark gray, fossiliferous, with manganese staining.											
	C			645.3	>4.5									646.66
			SHALE, silty, trace sand dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous, with trace											646.12
														645.26

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Weaver Consultants Group

LOG OF BORING NO. PWCG-2

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/6/2021 Northing (State Plane): 6814739.20

Boring End Date: 8/11/2021 Easting (State Pane): 2367642.31

Ground Elevation at Time of Drilling: 694.26 ft-msl

Top of Well Casing Datum Elevation: 697.22 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 672.8 ft-msl

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Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	C		pyrite.		>4.5									
55				638.3										
	C		SHALE, sandy, silty, dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous, with trace sandstone seams, organics, pyrite, and manganese staining.		>4.5								
60				634.3										
	C		SAND, shaly, silty, trace clay, wet, soft to hard, non-plastic, laminated to thinly bedded, interbedded, light gray and dark gray, with trace organics and sandstone seams.		>4.5								
65				629.3										
	C		SANDSTONE, shaly, silty, trace clay, wet, hard, non-plastic, laminated to thinly bedded, interbedded, light gray and dark gray, with trace organics.		>4.5								
70				624.3										
	C		SHALE, sandy, dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous.		>4.5									
				619.3										

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Project No: 0771-368-11-123-1C

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80	C		SHALE, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous.		>4.5									
85	C			609.3	>4.5									609.26
			Total Borehole Depth = 85.0											
90														
95														

TCLF PIEZOS_TCLF - SITE DATABASE (2021).GPJ TCLF - SITE TEMPLATE (PERMIT).GDT 2/23/22

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Weaver Consultants Group

LOG OF BORING NO. PWCG-3

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/4/2021 Northing (State Plane): 6814236.20

Boring End Date: 8/5/2021 Easting (State Pane): 2367438.65

Ground Elevation at Time of Drilling: 689.63 ft-msl

Top of Well Casing Datum Elevation: 692.71 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 681.6 ft-msl

▽ = Second Water Encountered at Time of Drilling: 661.6 ft-msl

▼ = Static Potentiometric Surface Elevation: 669.9 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	U		SAND, silty, clayey, moist, very stiff to hard, non-plastic to low plasticity, laminated, light yellowish brown with light gray mottling, with iron staining and trace ironstones.		4.5									687.63
	U				4.0									
	U				3.5									
5	U				3.5									
	U		- becomes reddish brown and light gray below 7.0'.	681.6	3.5									
	S		SAND, silty, trace clay, wet, very stiff, non-plastic, laminated, interbedded, dark gray, with iron staining.			36/50+								
10	A													
	U			678.1		32/23/16								
	U		SAND, silty, clayey, wet, very stiff, non-plastic to low plasticity, laminated, light gray and light yellowish brown, with iron staining.			5/7/10								
	U					8/13/14								
15	A			674.6										674.63
	S		CLAY, sandy, silty, moist, hard, low to medium plasticity, laminated, interbedded, light gray and light yellowish brown, with iron and manganese staining and trace ironstones.			8/9/14								
	S			671.6		8/12/14								
	U		CLAY, silty, sandy, moist, hard, low to medium plasticity, laminated, interbedded, brown, with irona dna manganese staining and trace ironstones.	669.6	>4.5									
20	U		SHALE, clayey, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, light gray.		>4.5									
	U			666.6	>4.5									
	S		SAND, silty, clayey, moist, very stiff, non-plastic to low plasticity, laminated, interbedded, friable, light yellowish brown and light gray, with iron and manganese staining.			28/50+								
				664.6										

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Weaver Consultants Group

LOG OF BORING NO. PWCG-3

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/4/2021 Northing (State Plane): 6814236.20

Boring End Date: 8/5/2021 Easting (State Pane): 2367438.65

Ground Elevation at Time of Drilling: 689.63 ft-msl

Top of Well Casing Datum Elevation: 692.71 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 681.6 ft-msl

▽ = Second Water Encountered at Time of Drilling: 661.6 ft-msl

▼ = Static Potentiometric Surface Elevation: 669.9 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		SHALE, sandy, silty, moist, hard, low to medium plasticity, laminated, interbedded, light gray.			13/23/40								
	S					17/27/50+								
				661.6										661.63
	S		SAND, shaly, silty, clayey, wet, soft to loose, non-plastic, laminated, interbedded, light to dark gray.			18/39/50+								
30	A													
	S					7/50+								658.73
	S					29/50+								
	S					50+								
	S													
35	A													
	S					50+								
	S					50+								
	S					50+								
40	A													
	S			648.6		31/50+								648.73
	C		SHALE, silty, sandy, dry, hard, plastic when moistened, laminated, interbedded, light to dark gray, fossiliferous, with manganese staining.											648.23
45														647.63
	C			641.6										
			SHALE, sandy, silty, with sandstone seams, dry, hard, plastic when moistened, laminated, interbedded, light to dark gray, fossiliferous, with manganese staining.											

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Weaver Consultants Group

LOG OF BORING NO. PWCG-3

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 8/4/2021 Northing (State Plane): 6814236.20

Boring End Date: 8/5/2021 Easting (State Pane): 2367438.65

Ground Elevation at Time of Drilling: 689.63 ft-msl

Top of Well Casing Datum Elevation: 692.71 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 681.6 ft-msl

▽ = Second Water Encountered at Time of Drilling: 661.6 ft-msl

▼ = Static Potentiometric Surface Elevation: 669.9 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
55	C													
				633.6										
	C		SAND, shaly, silty, moist to wet, hard, non-plastic to low plasticity, laminated, interbedded, light gray and dark gray, calcareous, fossiliferous.											
60				629.6										629.63
			Total Borehole Depth = 60.0'											
65														
70														

Field Tests | Laboratory Tests

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LOG OF BORING NO. PWCG-4

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 7/28/2021 Northing (State Plane): 6813684.57

Boring End Date: 7/29/2021 Easting (State Pane): 2367265.44

Ground Elevation at Time of Drilling: 704.65 ft-msl

Top of Well Casing Datum Elevation: 704.65 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 687.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 669.7 ft-msl

▼ = Static Potentiometric Surface Elevation: 673.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		SAND, silty, trace clay, moist, stiff to very stiff, non-plastic, no visible bedding, reddish brown and light reddish brown, with iron staining and roots.			3/6/7								
	S					8/13/16								702.65
	S					7/7/7								
5	A													
	S					9/11/11								
	U		CLAY, silty, sandy, moist, very stiff to hard, low to medium plasticity, laminated, interbedded, light gray and light yellowish brown, with trace organics, ironstone fragments and nodules, iron and manganese staining, and roots.	697.7										
	S					3/7/9								
10	U													
	U													
	A													689.65
15	U			687.7										
	U		SAND, silty, clayey, wet, very stiff to hard, non-plastic to low plasticity, laminated, interbedded, light gray and yellowish brown, with iron and manganese staining.											▽
	A													
20	S					13/25/33								
	S			681.7										
	S		SHALE, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, light gray, fossiliferous.			13/25/30								

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LOG OF BORING NO. PWCG-4

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 7/28/2021 Northing (State Plane): 6813684.57

Boring End Date: 7/29/2021 Easting (State Pane): 2367265.44

Ground Elevation at Time of Drilling: 704.65 ft-msl

Top of Well Casing Datum Elevation: 704.65 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 687.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 669.7 ft-msl

▼ = Static Potentiometric Surface Elevation: 673.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)
	A												
	C			674.7									
30	C		SHALE, sandy, silty, clayey, moist, hard, non-plastic to low plasticity, laminated, interbedded, light gray, friable, sand content increasing with depth.	669.7									
35	C		SAND, shaly, silty, clayey, wet, hard, non-plastic to low plasticity, laminated, interbedded, light gray, friable, fossiliferous.	664.7									
40	C		SANDSTONE, silty, shaly, wet, hard, non-plastic, laminated, dark gray and black, with trace organics.	658.7	>4.5								
45	C		SHALE, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous, with trace organics and manganese staining.		>4.5								

Groundwater Piezometer Construction Detail

671.65

669.25

659.25

658.75

657.65

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LOG OF BORING NO. PWCG-4

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 7/28/2021 Northing (State Plane): 6813684.57

Boring End Date: 7/29/2021 Easting (State Pane): 2367265.44

Ground Elevation at Time of Drilling: 704.65 ft-msl

Top of Well Casing Datum Elevation: 704.65 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 687.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 669.7 ft-msl

▼ = Static Potentiometric Surface Elevation: 673.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	C			649.7										
55	C		SHALE, sandy, silty, moist, hard, non-plastic to low plasticity, laminated, interbedded, dark gray and light gray, with trace organics and manganese staining.											
60	C				>4.5									
			SANDSTONE, shaly, silty, clayey, wet, hard, non-plastic to low plasticity, laminated, interbedded, light gray, friable.	641.2										
65			Total Borehole Depth = 65.0'	639.7										639.65
70														

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Weaver Consultants Group

LOG OF BORING NO. WCG-5

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/21/2021 Northing (State Plane): 6813716.14

Boring End Date: 7/27/2021 Easting (State Pane): 2367579.86

Ground Elevation at Time of Drilling: 687.03 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 667.0 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.0 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests / Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Borehole Plugging Detail
	S		CLAY, silty, sandy, moist, very stiff to hard, medium plasticity, laminated, brown and light yellowish brown, with trace ironstone fragments, iron staining, and roots.			3/2/3								
	S			684.0		1/1/2								
	S		CLAY, sandy, silty, moist, very stiff to hard, low plasticity, laminated, interbedded, with trace ironstone and chert fragments, iron staining, and roots.			1/3/4								
5	A													
	S					1/3/6								
	S					4/5/10								
	S			678.0		4/6/8								
	A		SHALE, clayey, sandy, dry, very stiff to hard, low to medium plasticity, laminated, interbedded, with trace ironstone fragments and iron staining.											
10	S					6/9/16								
	S					5/7/12								
	S					8/11/16								
	A													
15	S					15/15/20								
	S					10/13/20								
	S					13/13/26								
	A			667.0										▽
20	S		SAND, silty, trace clay, wet, stiff to loose, non-plastic, laminated, interbedded, gray and light reddish brown, with trace organics, and iron and manganese staining.			10/12/30								
	S					32/50+								
	S					17/33/50+								

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Weaver Consultants Group

LOG OF BORING NO. WCG-5

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/21/2021 Northing (State Plane): 6813716.14

Boring End Date: 7/27/2021 Easting (State Pane): 2367579.86

Ground Elevation at Time of Drilling: 687.03 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 667.0 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.0 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
	A													
	S					10/15/50+								
	S					25/50+								
	S					20/50+								
30	A													
	S			656.0		30/50+								
	S		SAND, shaly, trace silt, moist, very stiff to hard, non-plastic to low plasticity, laminated, interbedded, light gray, friable.	654.0		11/42/50+								
	S		SHALE, silty, sandy, moist, hard, medium to high plasticity, laminated, interbedded, light gray, fossiliferous, with trace manganese staining.			14/33/50+								
35	A													
	C				>4.5									
				647.0										▽
40	C		SANDSTONE, shaly, silty, wet, hard, non-plastic, laminated to very thinly bedded, crossbedded, interbedded, light and dark gray.		>4.5									
				643.0										
			SHALE, sandy, moist to wet, hard, low to medium plasticity, laminated, crossbedded, interbedded, light gray and dark gray.	642.0										
45	C		SANDSTONE, shaly, silty, wet, hard, non-plastic, laminated to very thinly bedded, crossbedded, interbedded, light and dark gray.		>4.5									
				637.0										

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Weaver Consultants Group

LOG OF BORING NO. WCG-5

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/21/2021 Northing (State Plane): 6813716.14

Boring End Date: 7/27/2021 Easting (State Pane): 2367579.86

Ground Elevation at Time of Drilling: 687.03 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 667.0 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.0 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
55	C		SHALE, with sandstone, silty, wet, hard, non-plastic to medium plasticity in intervals, laminated to thinly bedded, interbedded, light gray and dark gray, fossiliferous.	632.0	>4.5									
	C		SHALE, clayey, trace sand, dry, hard, plastic when moistened, laminated, interbedded, fossiliferous, with trace pyrite and manganese staining.		>4.5									
60														
	C				>4.5									
65														
	C			619.0	>4.5									
			SHALE, sandy, silty, dry, hard, plastic when moistened, laminated to thinly bedded, interbedded, light gray and dark gray, fossiliferous, with trace pyrite and manganese staining.	617.0										
70			Total Borehole Depth = 70.0'											617.03

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Weaver Consultants Group

LOG OF BORING NO. WCG-6

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/28/2021 Northing (State Plane): 6814069.05

Boring End Date: 5/3/2021 Easting (State Pane): 2370148.66

Ground Elevation at Time of Drilling: 696.23 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 679.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 644.7 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Borehole Plugging Detail
			Field Tests				Laboratory Tests							
	S		SAND, silty, moist, very soft to loose, non-plastic, no visible bedding, dark reddish brown, with iron staining.			4/6/5								
	S					6/6/9								
	S					13/34/40								
5	A			691.2										
	S		SAND, moist, loose to firm, non-plastic, no visible bedding, light yellowish brown and reddish brown, with iron staining.			14/50+								
	S					20/50+								
	S					50/50+								
10	A		- with trace silt below 10.0'.			20/50+								
	S					21/50+								
	S					21/50+								
15	A					18/50+								
	S		- becomes wet below 16.5'.			17/36/40								▽
	S					24/30/40								
20	A													
	S		- with trace manganese staining below 21.0.			5/23/40								
	S					35/50+								
	S													

TCLF BORINGS TCLF - SITE DATABASE (2021).GPJ TCLF - SITE TEMPLATE (PERMIT).GDT 2/23/22

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Weaver Consultants Group

LOG OF BORING NO. WCG-6

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/28/2021 Northing (State Plane): 6814069.05

Boring End Date: 5/3/2021 Easting (State Pane): 2370148.66

Ground Elevation at Time of Drilling: 696.23 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 679.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 644.7 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
	A													
	S		- becomes laminated below 26.0'.			30/5.0+								
	S			668.7		40/5.0+								
	S		SAND, silty, clayey, wet, hard, non-plastic to low plasticity, laminated, interbedded, light gray and dark gray, with iron staining.											
30	S													
	A			665.2										
	C		SILT, sandy, moist, hard, non-plastic, laminated, interbedded, light gray an medium gray, with sandstone seams.	663.2	>4.5									
			SHALE, silty, clayey, trace sand, moist, hard, medium to high plasticity, laminated, interbedded, with iron and manganese staining.	660.7										
35	C		SHALE, clayey (CH), moist, hard, high plasticity, laminated, interbedded, light gray, fossiliferous, with iron and manganese staining.		>4.5		100	19	120.3	55	20	35	3.0×10^{-8}	
			- contains trace sand below 40.0'.	655.2										
40	C		SHALE, silty, clayey, trace sand, dry, hard, plastic when moistened, laminated, interbedded, light gray and dark gray, fossiliferous.		>4.5									
			- 2.0" sandstone seam at 43.0'.	651.2										
45	C		SHALE, sandy, silty, trace clay, dry, hard, plastic when moistened, laminated to thinly bedded, interbedded and crossbedded, dark gray and light gray.		>4.5									

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Weaver Consultants Group

LOG OF BORING NO. WCG-6

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/28/2021 Northing (State Plane): 6814069.05

Boring End Date: 5/3/2021 Easting (State Pane): 2370148.66

Ground Elevation at Time of Drilling: 696.23 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 679.7 ft-msl

▽ = Second Water Encountered at Time of Drilling: 644.7 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
			- 2.0" chert seam at bottom of shale above 51.5'.	644.7										▽
	C		SANDSTONE, shaly, silty, wet, hard, non-plastic, laminated, interbedded and crossbedded, light gray, fossiliferous, with trace organics and sandstone seams.		>4.5									
55				641.2										641.23
			Total Borehole Depth = 55.0'											
60														
65														
70														

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LOG OF BORING NO. WCG-7

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/26/2021 Northing (State Plane): 6813714.33

Boring End Date: 4/27/2021 Easting (State Pane): 2369874.87

Ground Elevation at Time of Drilling: 703.59 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 687.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 650.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Borehole Plugging Detail
			Field Tests				Laboratory Tests							
0	S		SAND, trace silt, moist, soft to loose, non-plastic, no visible bedding, reddish brown, dark reddish brown, and light reddish brown, with trace iron and manganese staining.			6/8/9								
	S					4/13/11								
	S					8/16/14								
5	A													
	S					8/14/11								
	S													
	S													
10	A													
	S					50+								
	S					40/50+								
	S					26/50+								
15	A													
	S					30/50+								
	S		- becomes wet and dark reddish brown below 16.5'			27/29/50+								▽
	S					17/50+								
20	A													
	S					17/29/28								
	S					3/27/29								
	S					12/50+								

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LOG OF BORING NO. WCG-7

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/26/2021 Northing (State Plane): 6813714.33

Boring End Date: 4/27/2021 Easting (State Pane): 2369874.87

Ground Elevation at Time of Drilling: 703.59 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 687.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 650.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
	A					50+								
	S			677.1										
	S		SAND, silty, clayey, wet, soft to loose, laminated, interbedded, light gray, with trace clay seams.			36/50+								
	S					17/50+								
30	A													
	S													
	S			670.6		18/50+								
	S		SHALE, silty, clayey (CH), moist, hard, low to medium plasticity, laminated, interbedded, light gray, with trace organics.			42/35/41								
35	A													
	S					17/26/27								
	S					14/21/50+	100	17		66	21	45		
	A					9/22/38								
40	C				>4.5		99	16	118.5	65	21	44	2.8×10^{-8}	
	C			661.6										
	C		SHALE, silty, trace clay, dry, hard, plastic when moistened, laminated, interbedded, dark gray, fossiliferous, with trace organics.		>4.5									
45	C				>4.5									

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LOG OF BORING NO. WCG-7

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/26/2021 Northing (State Plane): 6813714.33

Boring End Date: 4/27/2021 Easting (State Pane): 2369874.87

Ground Elevation at Time of Drilling: 703.59 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 687.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 650.6 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
				653.1										
	C		SAND, silty, shaly, dry, hard, non-plastic, laminated, interbedded, light gray, friable, fossiliferous, with trace organics and sandstone seams.	650.6	>4.5									▽
55	C		SANDSTONE, silty, shaly, wet, hard, poorly consolidated, non-plastic, laminated to thinly bedded, interbedded, light gray and dark gray, friable.		>4.5									
60	C				>4.5									
				640.6										640.59
			Total Borehole Depth = 63.0'											
65														
70														

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LOG OF BORING NO. WCG-8

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/27/2021 Northing (State Plane): 6813304.46

Boring End Date: 4/28/2021 Easting (State Pane): 2369673.60

Ground Elevation at Time of Drilling: 702.37 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 680.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
	S		SAND, silty, moist, very soft to loose, non-plastic, no visible bedding, reddish brown, with iron staining and roots.			0/2/6								
	S					4/7/21								
	S					12/30/50+								
5	A		- with trace chert fragments below 4.5'.											
	S					8/36/50+								
	S					16/50+								
	S					24/50+								
10	A													
	S					23/50+								
	S					21/40/50+								
	S					21/40/50+								
15	A													
	S					22/40/50+								
	S					26/29/11								
				684.4										
	S		SHALE, silty, sandy, moist, hard, low plasticity, laminated, light gray with iron staining.			4/9/17								
20	A													
	S					3/8/30								
				680.9										▽
	S		SAND, silty, wet, hard, non-plastic, laminated, light yellowish brown.			13/50+								
	S					50+								
				677.4										

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LOG OF BORING NO. WCG-8

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/27/2021 Northing (State Plane): 6813304.46

Boring End Date: 4/28/2021 Easting (State Pane): 2369673.60

Ground Elevation at Time of Drilling: 702.37 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 680.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Borehole Plugging Detail
	A		SHALE, sandy, silty (CL), moist, very stiff to hard, medium plasticity, laminated, interbedded and cross bedded, light gray and dark gray, with trace manganese staining.				52	16	112.8	33	17	16	$9.3x10^{-8}$	
	C				>4.5									
30														
	C		- 2" chert seam at bottom of silt above 32.5'.	669.9	>4.5									
			SHALE, clayey, silty (CL), trace sand, moist, hard, high plasticity, laminated to thinly bedded, interbedded, light gray and dark gray, fossiliferous.											
35														
	C				>4.5									
40			- becomes dry below 40.0'.				91	18	113.3	43	18	25	$2.6x10^{-8}$	
	C		- 3.0" sandstone seam at 42.5'.		>4.5									
45			- with organics and pyrite below 45.0'.											
	C				>4.5									

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LOG OF BORING NO. WCG-8

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 4/27/2021 Northing (State Plane): 6813304.46

Boring End Date: 4/28/2021 Easting (State Pane): 2369673.60

Ground Elevation at Time of Drilling: 702.37 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring. Borehole plugged with high solids bentonite grout upon completion.

▽ = First Water Encountered at Time of Drilling: 680.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Borehole Plugging Detail
			- 4.0 sandstone seam at 50.0'. - 2.0" lignite seam at 50.5'.	650.4										
55	C		SAND, shaly, silty, dry, hard, non-plastic, laminated, light gray, with sandstone and silstone seams.		>4.5									
	C				>4.5									
60				642.4										642.37
			Total Borehole Depth = 60.0'											
65														
70														

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LOG OF BORING NO. PWCG-9

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/3/2021 Northing (State Plane): 6814149.29

Boring End Date: 5/4/2021 Easting (State Pane): 2370537.73

Ground Elevation at Time of Drilling: 697.06 ft-msl

Top of Well Casing Datum Elevation: 699.98 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 679.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 641.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 643.3 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		SAND, silty, moist, soft to loose, non-plastic, no visible bedding, reddish brown to dark reddish brown, with roots.			0/0/15								
	S					3/15/30								695.06
	S			693.1		11/12/12								
5	A		SAND, trace silt, moist, soft to loose, non-plastic, no visible bedding, light yellowish brown and dark reddish brown, with iron staining and roots.			6/11/29								
	S					9/34/50+								
	S					9/33/50+								
	S													
10	A					13/50+								
	S			685.1		12/50+								
	S		SANDSTONE, silty, dry to moist, hard, non-plastic, laminated, very dusky red, very dark red, and light reddish brown, poorly consolidated, friable, with iron staining.			12/50+								
	S													
15	A					18/50+								682.06
	S					3/3/31								
	S			679.1										
	S		SAND, silty, wet. soft to loose, non-plastic, laminated, light yellowish brown and reddish brown, with iron staining.			10/46/50+								
20	A					16/23/25								
	S					16/23/50+								
	S					5/13/50+								
	S													

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LOG OF BORING NO. PWCG-9

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/3/2021 Northing (State Plane): 6814149.29

Boring End Date: 5/4/2021 Easting (State Pane): 2370537.73

Ground Elevation at Time of Drilling: 697.06 ft-msl

Top of Well Casing Datum Elevation: 699.98 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 679.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 641.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 643.3 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	A													
	S					12/50+								
	S					35/50+								
	S		- contains trace clay below 28.0'.			14/15/50+								
30	A													
	S					18/50+								
	S			665.1		30/50+								
	S		SAND, silty, clayey, moist, very stiff to hard, non-plastic to low plasticity, laminated, interbedded, light gray, with manganese staining.			22/50+								
	S													
35	A			662.1										
			SHALE, silty, sandy, moist, hard, medium plasticity, laminated, interbedded, crossbedded, light gray and gray.											
				657.1										
40			SHALE, clayey, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, fossiliferous.											
				652.1										
45			SHALE, sandy, silty, clayey, dry, hard, non-plastic, laminated, interbedded, light gray and dark gray.											

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LOG OF BORING NO. PWCG-9

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/3/2021 Northing (State Plane): 6814149.29

Boring End Date: 5/4/2021 Easting (State Pane): 2370537.73

Ground Elevation at Time of Drilling: 697.06 ft-msl

Top of Well Casing Datum Elevation: 699.98 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 679.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 641.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 643.3 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
55	C				>4.5		98	12	130.9	38	17	21		643.06
	C				>4.5		98	13	129.7	39	17	22		
				641.1										640.66
60	C		SAND, silty, trace clay, wet, hard, non-plastic, laminated to very thinly bedded, interbedded, light gray and dark gray, with poorly consolidated sandstone seams.		>4.5									
	C		- becomes moist to wet below 61.0'.		>4.5									
65				631.1										
	C		SHALE, sandy, silty, clayey, moist, hard, laminated to thinly bedded, interbedded, light gray and dark gray, and tan, calcareous, fossiliferous, with trace sandstone seams.		>4.5								630.66
70														630.16
	C				>4.5									630.06
				622.1										

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LOG OF BORING NO. PWCG-9

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/3/2021 Northing (State Plane): 6814149.29

Boring End Date: 5/4/2021 Easting (State Pane): 2370537.73

Ground Elevation at Time of Drilling: 697.06 ft-msl

Top of Well Casing Datum Elevation: 699.98 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 679.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 641.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 643.3 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	C		SAND, silty, trace clay, moist, hard, laminated, interbedded, dark gray and black, calcareous, with sandstone seams.	618.1	>4.5									
80	C		SHALE, sandy, silty, clayey, moist, hard, laminated to thinly bedded, interbedded, light gray and dark gray, calcareous, fossiliferous, with trace sandstone seams.	612.1	>4.5									612.06
85			Total Borehole Depth = 85.0'											
90														
95														

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LOG OF BORING NO. PWCG-10

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/13/2021 Northing (State Plane): 6813712.69

Boring End Date: 5/14/2021 Easting (State Pane): 2370113.39

Ground Elevation at Time of Drilling: 701.92 ft-msl

Top of Well Casing Datum Elevation: 704.93 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 683.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 649.4 ft-msl

▼ = Static Potentiometric Surface Elevation: 652.5 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		SAND, trace silt, moist, soft to loose, non-plastic, no visible bedding, reddish brown and very dusky red, with trace iron staining and roots.			9/16/19								
	S					10/8/17								699.92
	S					13/50+								
5	A													
	S					20/50+								
	S		- becomes light yellowish brown, with manganese staining below 7.0'.			20/50+								
	S					18/50+								
10	A													
	S					29/50+								
	S					25/50+								
	S					22/50+								
15	A													686.92
	S					19/50+								
	S					19/50+								
	S		- becomes wet below 18.0'.			25/36/28								▽
	S													
20	A													
	S					26/50+								
	S			679.4		35/29/30								
	S		SAND, silty, clayey, moist to wet, firm to loose, non-plastic, laminated, interbedded, light yellowish brown and light gray, with iron staining.	677.9		32/50+								
			SAND, silty, moist to wet, loose, non-plastic, laminated, interbedded, crossbedded, light gray and tan, with trace											

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LOG OF BORING NO. PWCG-10

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/13/2021 Northing (State Plane): 6813712.69

Boring End Date: 5/14/2021 Easting (State Pane): 2370113.39

Ground Elevation at Time of Drilling: 701.92 ft-msl

Top of Well Casing Datum Elevation: 704.93 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 683.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 649.4 ft-msl

▼ = Static Potentiometric Surface Elevation: 652.5 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	A		sandstone seams and iron staining.			16/50+								
	S													
	S					17/50+								
				673.9										
	S		SAND, silty, clayey, moist, very stiff, non-plastic to low plasticity, laminated, interbedded, light gray and dark gray, friable.			11/50+								
	A			671.9										
30			SILT, sandy, clayey, moist, hard, low plasticity, laminated, interbedded, gray, with siltstone seams, clay content increasing with depth.											
	C			668.9	>4.5									
			SHALE, silty, clayey, moist, hard, medium to high plasticity, laminated, interbedded, light gray and dark gray.											
35														
				664.4										
	C		SHALE, clayey, silty, dry, hard, plastic when moistened, laminated, interbedded, light gray, fossiliferous.		>4.5									
40														
	C				>4.5									
				657.4										
45			SAND, silty, moist, stiff to hard, non-plastic, laminated to very thinly bedded, interbedded, crossbedded, with poorly consolidated sandstone seams.											
	C				>4.5									653.92

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LOG OF BORING NO. PWCG-10

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/13/2021 Northing (State Plane): 6813712.69

Boring End Date: 5/14/2021 Easting (State Pane): 2370113.39

Ground Elevation at Time of Drilling: 701.92 ft-msl

Top of Well Casing Datum Elevation: 704.93 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 683.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 649.4 ft-msl

▼ = Static Potentiometric Surface Elevation: 652.5 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
														651.12
				649.4										
	C		SANDSTONE, shaly, silty, wet, hard, non-plastic to low plasticity, laminated, interbedded, crossbedded, light gray and dark gray, calcareous, fossiliferous, friable, with poorly consolidated seams, trace organics and manganese staining.		>4.5									
55														
	C				>4.5									
60														
	C			638.9	>4.5									
			SHALE, sandy, silty, moist to wet, hard, non-plastic to low plasticity, laminated to thinly bedded, interbedded, light gray and dark gray, crossbedded, with poorly consolidated sandstone seams.											
65														
	C				>4.5									
				632.9										
			SAND, silty, trace clay, wet, very stiff to hard, non-plastic, laminated to very thinly bedded, interbedded, light gray, friable, with trace organics and manganese staining.											
70				629.9										631.12
														630.62
	C		SHALE, sandy, silty, moist, hard, low plasticity, laminated, interbedded, light gray, with trace siltstone seams and manganese staining.		>4.5									629.92
				626.9										

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Weaver Consultants Group

LOG OF BORING NO. PWCG-10

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/13/2021 Northing (State Plane): 6813712.69

Boring End Date: 5/14/2021 Easting (State Pane): 2370113.39

Ground Elevation at Time of Drilling: 701.92 ft-msl

Top of Well Casing Datum Elevation: 704.93 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 683.9 ft-msl

▽ = Second Water Encountered at Time of Drilling: 649.4 ft-msl

▼ = Static Potentiometric Surface Elevation: 652.5 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
80	C		SHALE, silty, sandy (CH), dry, hard, plastic when moistened, laminated to very thinly bedded, interbedded, light gray and dark gray, with trace sandstone seams, organics, and manganese staining.		>4.5		99	15	93.6	56	20	36	2.1×10^{-8}	
85	C				>4.5									
90	C			611.9	>4.5									611.92
			Total Borehole Depth = 90.0'											
95														

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LOG OF BORING NO. PWCG-11

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/5/2021 Northing (State Plane): 6813240.98

Boring End Date: 5/6/2021 Easting (State Pane): 2369833.06

Ground Elevation at Time of Drilling: 707.22 ft-msl

Top of Well Casing Datum Elevation: 710.06 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 694.2 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.2 ft-msl

▼ = Static Potentiometric Surface Elevation: 657.1 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		FILL (roadbase), silt, gravelly, sandy, dry, loose, non-plastic, very light gray to white.	705.7		5/6/11									
	S		SAND, silty, clayey, moist, very stiff, non-plastic to low plasticity, laminated, reddish brown, with iron staining.			5/8/20									705.22
	S					6/12/22									
5	A														
	S			701.2		9/35/50+									
	S		SAND, traces silt, moist, very soft to loose, non-plastic, no visible bedding, light yellowish brown, with iron staining.			4/25/50+									
	S					9/38/50+									
10	A														
	S		- becomes yellow and light yellowish brown with manganese staining below 11.0'.			18/50+									
	S			694.2		11/50+									
	S		SAND, silty, wet, loose, non-plastic, laminated, brown and light yellowish brown mottling, with iron and manganese staining.			21/50+									
15	A														692.22
	S					20/50+									
	S					26/50+									
	S					40/50+									
20	A														
	S					34/50+									
	S					45/13/16									
	S					10/15/20									
				682.2											

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LOG OF BORING NO. PWCG-11

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/5/2021 Northing (State Plane): 6813240.98

Boring End Date: 5/6/2021 Easting (State Pane): 2369833.06

Ground Elevation at Time of Drilling: 707.22 ft-msl

Top of Well Casing Datum Elevation: 710.06 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 694.2 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.2 ft-msl

▼ = Static Potentiometric Surface Elevation: 657.1 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	A		CLAY, silty, sandy, moist, very stiff to hard, medium plasticity, laminated, interbedded, gray and light yellowish brown, with iron and manganese staining.			15/30/50+								
	S			680.2										
	S		SILT, sandy, clayey, moist, very stiff to hard, low plasticity, laminated, interbedded, light gray and light yellowish brown, with trace pyrite and iron and manganese staining.											
	S													
30	A			677.2										
	C		SAND, silty, moist, hard, non-plastic, laminated, interbedded, crossbedded, light gray and medium gray, with iron and manganese staining.		>4.5									
35				670.2										
	C		SILT, sandy, clayey, moist, hard, non-plastic to low plasticity, laminated to thinly bedded, interbedded, light gray and dark gray, with trace poorly consolidated sandstone seams.		>4.5								
40				666.2										
	C		SHALE, silty, sandy, clayey, dry, hard, plastic when moistened, laminated, interbedded, light gray and medium gray, fossiliferous.		>4.5									
45				662.2										
	C		SHALE, clayey, silty, trace sand, dry, hard, plastic when moistened, laminated, interbedded, medium gray and dark gray, fossiliferous. - 1.2" siltstone seam at 46.5'.		>4.5								

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LOG OF BORING NO. PWCG-11

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/5/2021 Northing (State Plane): 6813240.98

Boring End Date: 5/6/2021 Easting (State Pane): 2369833.06

Ground Elevation at Time of Drilling: 707.22 ft-msl

Top of Well Casing Datum Elevation: 710.06 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 694.2 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.2 ft-msl

▼ = Static Potentiometric Surface Elevation: 657.1 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Laboratory Tests	Groundwater Piezometer Construction Detail
	C			654.2	>4.5											
			SHALE, sandy, moist, hard, low plasticity, laminated, interbedded, medium gray, fossiliferous.	652.2												
55	C		SHALE, clayey, silty, trace sand, moist, hard, medium to high plasticity, laminated, interbedded, medium gray, fossiliferous.	650.2												650.22
	C		SANDSTONE, silty, moist to wet, hard, non-plastic, laminated to thinly bedded, interbedded, crossbedded, light gray, calcareous, fossiliferous.		>4.5											
60			- becomes wet below 60.0'.													646.42
	C				>4.5											
65				642.2												
	C		SAND, silty, trace clay, moist to wet, hard, non-plastic, laminated to very thinly bedded, cross bedded, light gray and dark gray, with manganese staining.		>4.5											
			- 1.5" sandstone seam at 68.0'.													
70				636.7												
	C		SHALE, sandy, clayey, moist to wet, hard, non-plastic to low plasticity, laminated to very thinly bedded, interbedded, crossbedded, light gray, dark gray, and brown, fossiliferous, with manganese staining.		>4.5											

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LOG OF BORING NO. PWCG-11

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/5/2021 Northing (State Plane): 6813240.98

Boring End Date: 5/6/2021 Easting (State Pane): 2369833.06

Ground Elevation at Time of Drilling: 707.22 ft-msl

Top of Well Casing Datum Elevation: 710.06 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 694.2 ft-msl

▽ = Second Water Encountered at Time of Drilling: 647.2 ft-msl

▼ = Static Potentiometric Surface Elevation: 657.1 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
				630.2										631.42 630.92 630.22
	C		SHALE, clayey, sandy, dry, hard, plastic when moistened, laminated to very thinly bedded, interbedded, dark gray and light gray, with trace sandstone and siltstone seams.		>4.5									
80														
	C		- 1.0" siltstone seam at 81.0'.											
			- 3.0" sandstone seam at 84.5'.											
85														
	C		- 1.5" siltstone seam at 88.0'.											
90														
	C													
95				612.2										612.22
			Total Borehole Depth = 95.0'											

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Weaver Consultants Group

LOG OF BORING NO. PWCG-12

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/7/2021 Northing (State Plane): 6812843.77

Boring End Date: 5/12/2021 Easting (State Pane): 2369563.48

Ground Elevation at Time of Drilling: 705.12 ft-msl

Top of Well Casing Datum Elevation: 708.29 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 697.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 645.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 658.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	S		SAND, silty, moist, soft to loose, non-plastic, no visible bedding, reddish brown and brown, with trace calcareous nodules, iron staining, and roots.			2/4/9								
	S					8/25/40								703.12
	S					15/50+								
5	A													
	S					14/43/50+								
	S		- becomes wet below 6.5'.			6/37/50+								
	S					16/50+								
10	A													
	S					18/50+								
	S					14/30/35								
	S			691.1		50								
15	A		SAND, trace silt, hard, wet, loose, non-plastic, no visible bedding, light yellowish brown, with iron staining.			40/50+								690.12
	S					13/36/50+								
	S					35/50+								
20	A													
	S					50+								
	S			683.1		50+								
	S		SAND, silty, wet, hard, non-plastic, laminated, light yellowish brown, with trace siltstone seams and iron staining.			42/50+								
	S													

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LOG OF BORING NO. PWCG-12

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/7/2021 Northing (State Plane): 6812843.77

Boring End Date: 5/12/2021 Easting (State Pane): 2369563.48

Ground Elevation at Time of Drilling: 705.12 ft-msl

Top of Well Casing Datum Elevation: 708.29 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 697.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 645.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 658.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Field Tests: Hand Penetrometer Test (tsf)	Field Tests: Penetration Blows/6-inches	Laboratory Tests: Percent Passing No. 200	Laboratory Tests: Percent Moisture Content	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Liquid Limit	Laboratory Tests: Plastic Limit	Laboratory Tests: Plasticity Index	Laboratory Tests: Permeability (cm/sec)	Groundwater Piezometer Construction Detail
	A													
	S					27/25/12								
	S					8/15/23								
				677.1										
	S		SILT, sandy, clayey, moist, very stiff to hard, low plasticity, laminated, interbedded, with iron and manganese staining.											
	A			675.1										
30	C		CLAY, sandy, silty, moist, very stiff to hard, low to medium plasticity, laminated, interbedded, light gray, dark gray, and light yellowish brown, with trace pyrite and iron staining.		3.5									
				670.1										
35	C		CLAY, silty, shaly, sandy, moist, very stiff to hard, medium plasticity, laminated, interbedded, light gray and dark gray, with trace organics. - becomes fossiliferous below 37.0'. - becomes dry below 38.0'.		4.0									
				665.1										
40	C		SHALE, silty, sandy, clayey, dry, hard, plastic when moistened, laminated to very thinly bedded, interbedded, with trace organics.		>4.5									
45	C				>4.5									
				655.1										

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LOG OF BORING NO. PWCG-12

Weaver Consultants Group

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/7/2021 Northing (State Plane): 6812843.77

Boring End Date: 5/12/2021 Easting (State Pane): 2369563.48

Ground Elevation at Time of Drilling: 705.12 ft-msl

Top of Well Casing Datum Elevation: 708.29 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 697.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 645.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 658.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Laboratory Tests	Groundwater Piezometer Construction Detail
	C		SAND, silty, trace clay, moist, hard, non-plastic, laminated, interbedded, light gray, with trace organics and manganese staining.		>4.5											
55				650.1												
	C		SHALE, clayey, silty, sandy, dry, hard, plastic when moistened, laminated to thinly bedded, interbedded, light gray and dark gray, fossiliferous, with trace organics and pyrite.		>4.5										
60				645.1												645.12 ▽
	C		SANDSTONE, shaly, silty, moist to wet in intervals, hard, non-plastic to low plasticity, laminated to very thinly bedded, interbedded, light gray and dark gray, friable, with trace organics.		>4.5											
			- 2.0" sandstone seam at 62.5'.													
65																640.92
	C				>4.5											
70			- 1.0" sandstone seam at 70.0'.	633.1												
	C		SAND, shaly, silty moist to wet, hard, non-plastic to low plasticity, laminated to very thinly bedded, interbedded, with trace organics and manganese staining.		>4.5										

TCLF PIEZOS TCLF - SITE DATABASE (2021).GPJ TCLF - SITE TEMPLATE (PERMIT).GDT 2/23/22

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LOG OF BORING NO. PWCG-12

Project Title: TCLF - 2021 MPA Subsurface Investigation

Project No: 0771-368-11-123-1C

Logging Geologist: AKE/CGM

Drilling Firm: CoreCoUSA

Boring Start Date: 5/7/2021 Northing (State Plane): 6812843.77

Boring End Date: 5/12/2021 Easting (State Pane): 2369563.48

Ground Elevation at Time of Drilling: 705.12 ft-msl

Top of Well Casing Datum Elevation: 708.29 ft-msl

Remarks: Boring advanced via 10.25-inch augers and 6.25-inch wash rotary reaming bit and continuously sampled via Shelby tubes, split spoon, and rotary coring.

▽ = First Water Encountered at Time of Drilling: 697.1 ft-msl

▽ = Second Water Encountered at Time of Drilling: 645.1 ft-msl

▼ = Static Potentiometric Surface Elevation: 658.4 ft-msl

Depth (ft)	Sample Type and Interval	Graphic Log	Description	FT MSL	Hand Penetrometer Test (tsf)	Penetration Blows/6-inches	Field Tests	Percent Passing No. 200	Percent Moisture Content	Dry Density (pcf)	Liquid Limit	Plastic Limit	Plasticity Index	Permeability (cm/sec)	Laboratory Tests	Groundwater Piezometer Construction Detail
80	C				>4.5											625.92 625.42 625.12
			SHALE, silty, sandy, clayey, dry, hard, plastic when moistened, laminated to very thinly bedded, interbedded, light gray and dark gray, with trace organics and sandstone seams.	625.1												
85	C				>4.5											
90	C				>4.5											615.12
			Total Borehole Depth = 90.0'	615.1												
95																

TCLF PIEZOS TCLF - SITE DATABASE (2021).GPJ TCLF - SITE TEMPLATE (PERMIT).GDT 2/23/22

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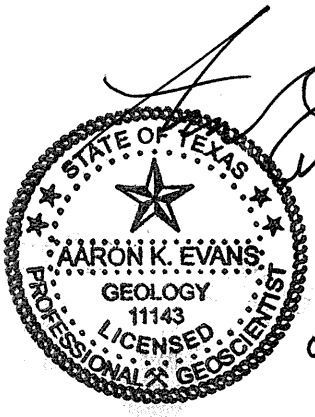
APPENDIX IIIG-C

SITE GEOLOGIC DATA



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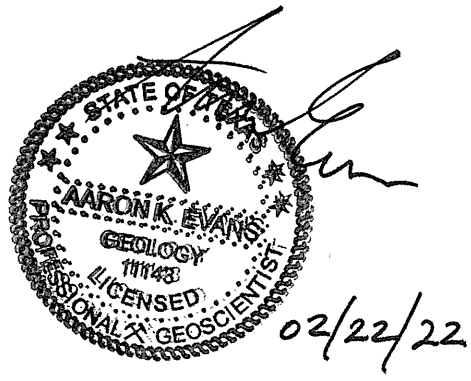
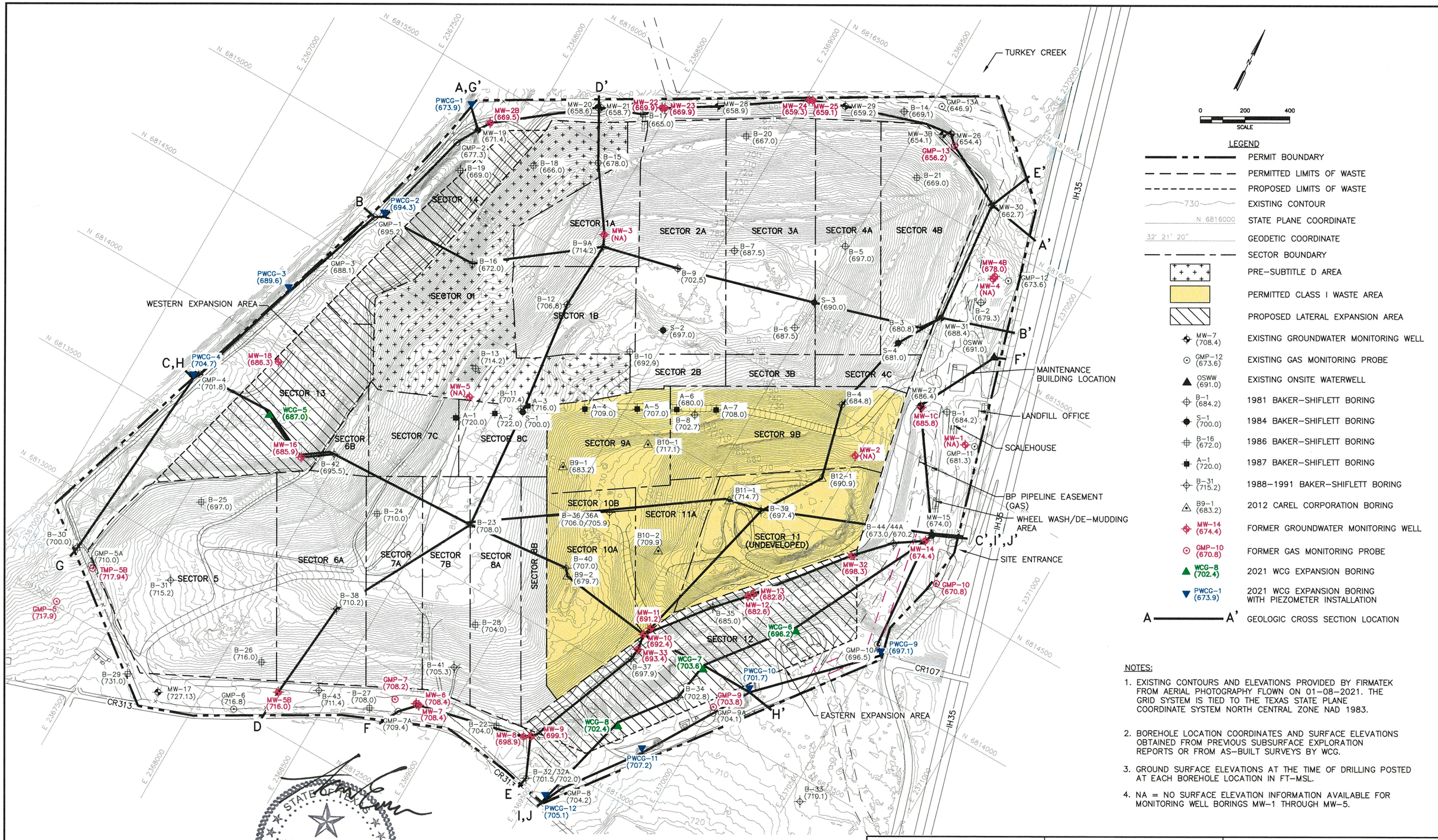
CONTENTS

FIGURE IIIG-C-1 – Geologic Cross Section Index Map
FIGURE IIIG-C-2 – Geologic Cross Section A-A′
FIGURE IIIG-C-3 – Geologic Cross Section B-B′
FIGURE IIIG-C-4 – Geologic Cross Section C-C′
FIGURE IIIG-C-5 – Geologic Cross Section D-D′
FIGURE IIIG-C-6 – Geologic Cross Section E-E′
FIGURE IIIG-C-7 – Geologic Cross Section F-F′
FIGURE IIIG-C-8 – Geologic Cross Section G-G’
FIGURE IIIG-C-9 – Geologic Cross Section H-H′
FIGURE IIIG-C-10 – Geologic Cross Section I-I’
FIGURE IIIG-C-11 – Geologic Cross Section J-J’
FIGURE IIIG-C-12 – Expanded Geologic Cross Section F-F′ Index Map
FIGURE IIIG-C-13 – Expanded Geologic Cross Section F-F′





0 200 400
SCALE

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- 730 EXISTING CONTOUR
- N 6816000 STATE PLANE COORDINATE
- 32° 21' 20" GEODETIC COORDINATE
- SECTOR BOUNDARY
- PRE-SUBTITLE D AREA
- PERMITTED CLASS I WASTE AREA
- PROPOSED LATERAL EXPANSION AREA
- MW-7 (708.4) EXISTING GROUNDWATER MONITORING WELL
- GMP-12 (673.6) EXISTING GAS MONITORING PROBE
- OSWW (691.0) EXISTING ONSITE WATERWELL
- B-1 (684.2) 1981 BAKER-SHIFLETT BORING
- S-1 (700.0) 1984 BAKER-SHIFLETT BORING
- B-16 (672.0) 1986 BAKER-SHIFLETT BORING
- A-1 (720.0) 1987 BAKER-SHIFLETT BORING
- B-31 (715.2) 1988-1991 BAKER-SHIFLETT BORING
- B9-1 (683.2) 2012 CAREL CORPORATION BORING
- MW-14 (674.4) FORMER GROUNDWATER MONITORING WELL
- GMP-10 (670.8) FORMER GAS MONITORING PROBE
- WCG-8 (702.4) 2021 WCG EXPANSION BORING
- PWCG-1 (673.9) 2021 WCG EXPANSION BORING WITH PIEZOMETER INSTALLATION
- A — A' GEOLOGIC CROSS SECTION LOCATION

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. BOREHOLE LOCATION COORDINATES AND SURFACE ELEVATIONS OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION REPORTS OR FROM AS-BUILT SURVEYS BY WCG.
3. GROUND SURFACE ELEVATIONS AT THE TIME OF DRILLING POSTED AT EACH BOREHOLE LOCATION IN FT-MSL.
4. NA = NO SURFACE ELEVATION INFORMATION AVAILABLE FOR MONITORING WELL BORINGS MW-1 THROUGH MW-5.

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION INDEX MAP

TURKEY CREEK LANDFILL
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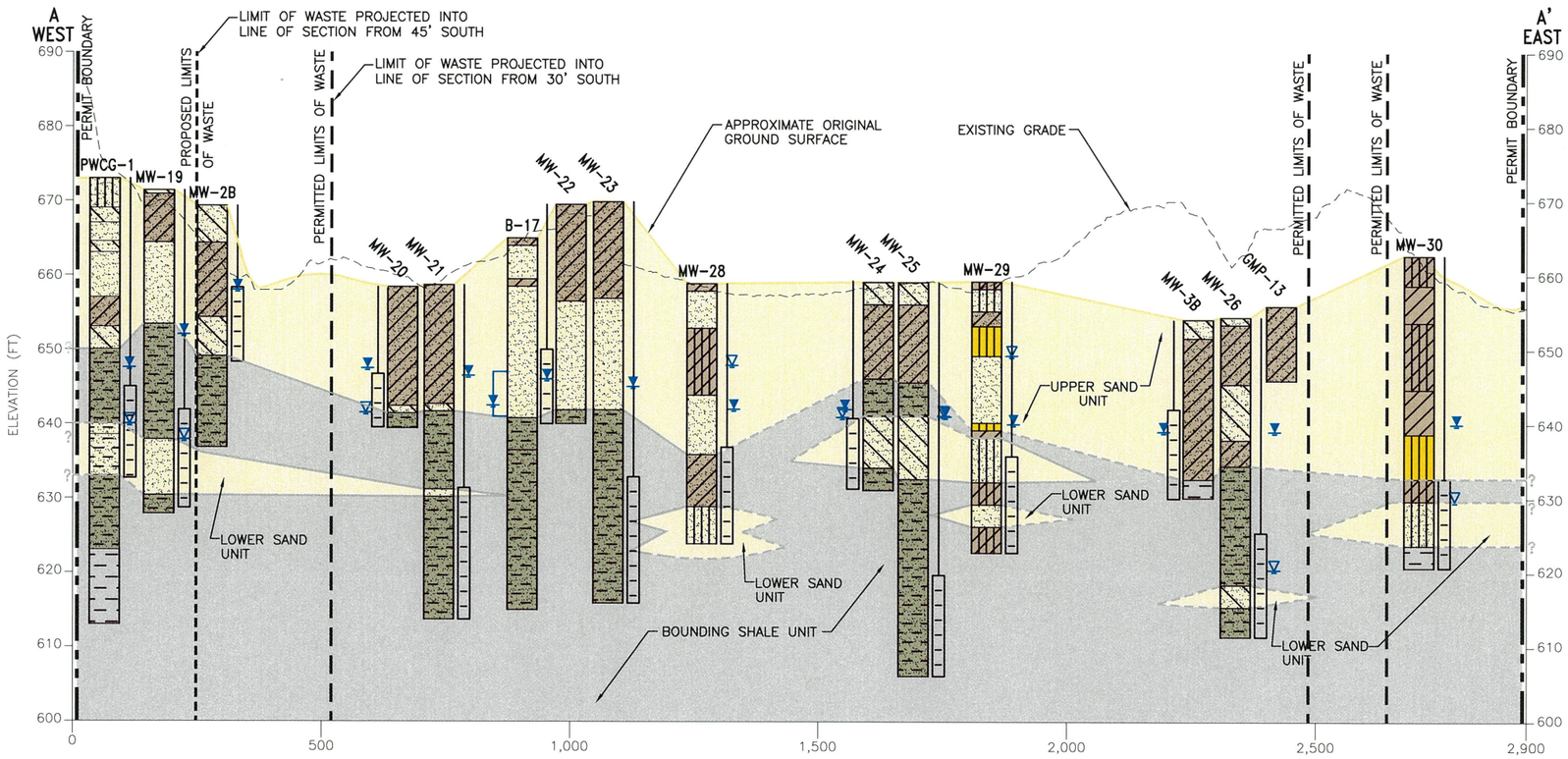
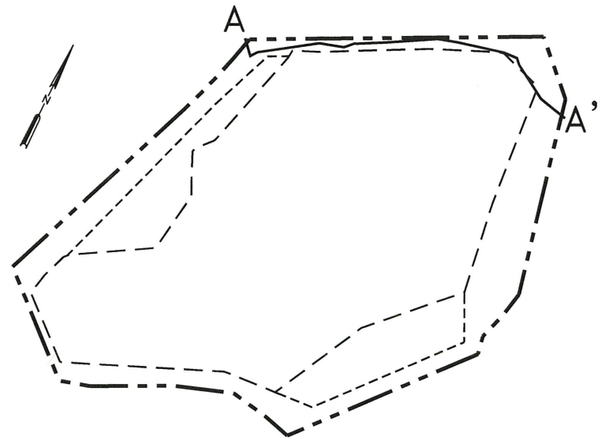
FIGURE IIIG-C-1

0:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-C-1-CROSS SECTION INDEX MAP 2021.dwg, rarrington, 1:2





SECTION LOCATION MAP
NTS

LEGEND

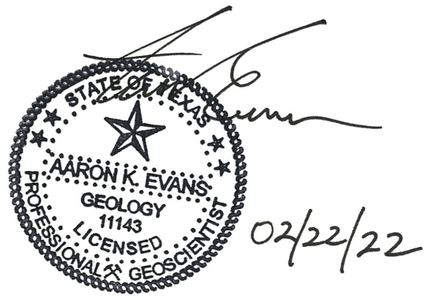
- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE

- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND OR SILTY SANDSTONE
- SAND or SANDSTONE
- SILT OR SILTSTONE
- CLAY
- SHALY SAND or SHALY SANDSTONE

- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET



NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION A-A'

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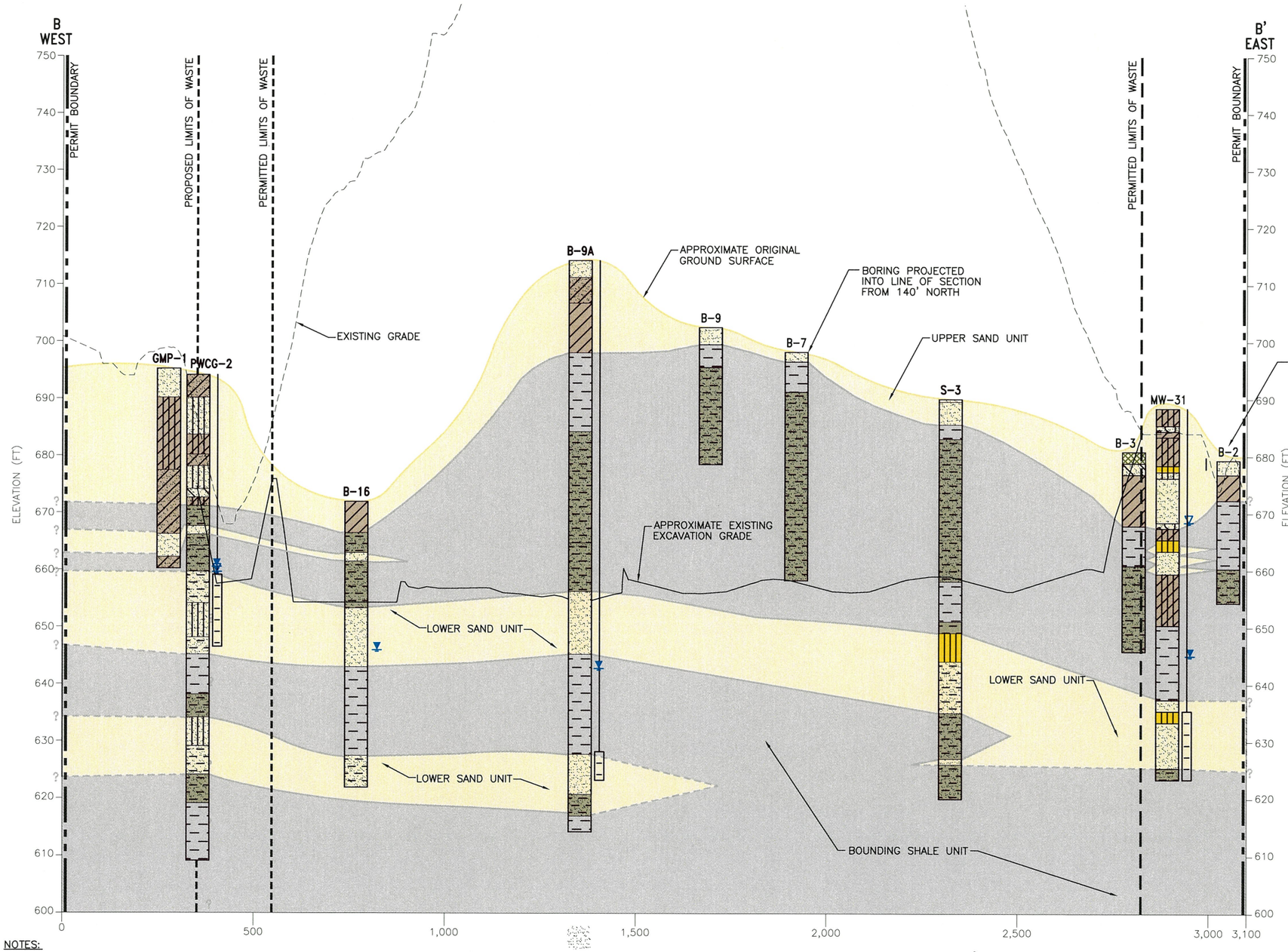
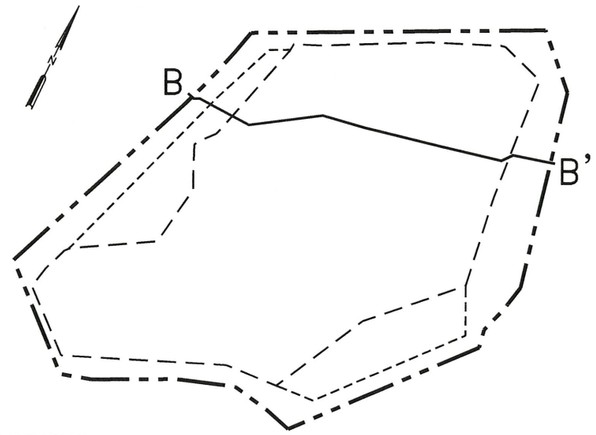
FIGURE IIIG-C-2

O:\0771\368\EXPANSION 2021\PART III\IIG\IIG-C-2-11_CROSS SECTIONS.dwg, rarrington, 1:2





SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE

- SANDY CLAY
- CLAYEY SAND
- GRAVEL or SANDY GRAVEL
- SHALE or SILTY SHALE
- SILTY CLAY
- SHALY SAND or SHALY SANDSTONE
- SAND or SANDSTONE
- SILTY SAND OR SILTY SANDSTONE
- EARTHEN FILL
- CLAY
- SILT OR SILTSTONE
- SANDY SHALE

- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

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GEOLOGIC CROSS SECTION B-B'

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FIGURE IIIG-C-3

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O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-C-2-11_CROSS SECTIONS.dwg, rarrington, 1:2

C WEST

C' EAST

ELEVATION (FT)

PERMIT BOUNDARY

PROPOSED LIMITS OF WASTE

PERMITTED LIMITS OF WASTE

PERMITTED LIMITS OF CLASS 1 AREA

EXISTING GRADE

APPROXIMATE ORIGINAL GROUND SURFACE

APPROXIMATE EXCAVATION GRADE

UPPER SAND UNIT

LOWER SAND UNIT

BOUNDING SHALE UNIT

BORING PROJECTED INTO LINE OF SECTION FROM 80' SOUTH

BORING PROJECTED INTO LINE OF SECTION FROM 40' SOUTH

GMP-4

PWCG-4

WCG-5

MW-16

B-42

B-23

B-36A

B11-1

B-39

B-44A

MW-14

MW-15

1.1×10^{-8}

2.2×10^{-9}

740 730 720 710 700 690 680 670 660 650 640 630 620 610 600

0 500 1,000 1,500 2,000 2,500 3,000 3,500

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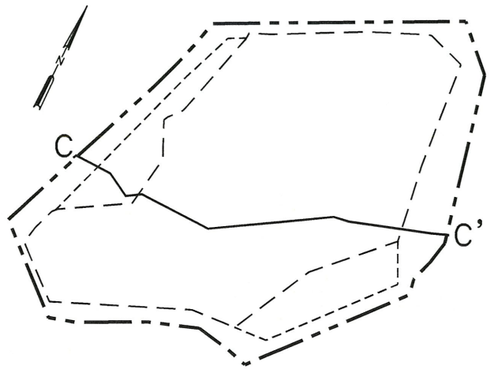

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)
- 2.2×10^{-9} LABORATORY VERTICAL PERMEABILITY (cm/sec) FROM APRIL 2012 SUBSURFACE INVESTIGATION BY THE CAREL CORPORATION.

- SANDY CLAY
- SHALE or SILTY SHALE
- SAND or SANDSTONE
- CLAY
- CLAYEY SAND
- SILTY CLAY
- SILTY SAND
- SILT OR SILTSTONE
- SANDY SHALE
- NOT LOGGED
- SHALY SAND or SHALY SANDSTONE

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION C-C'

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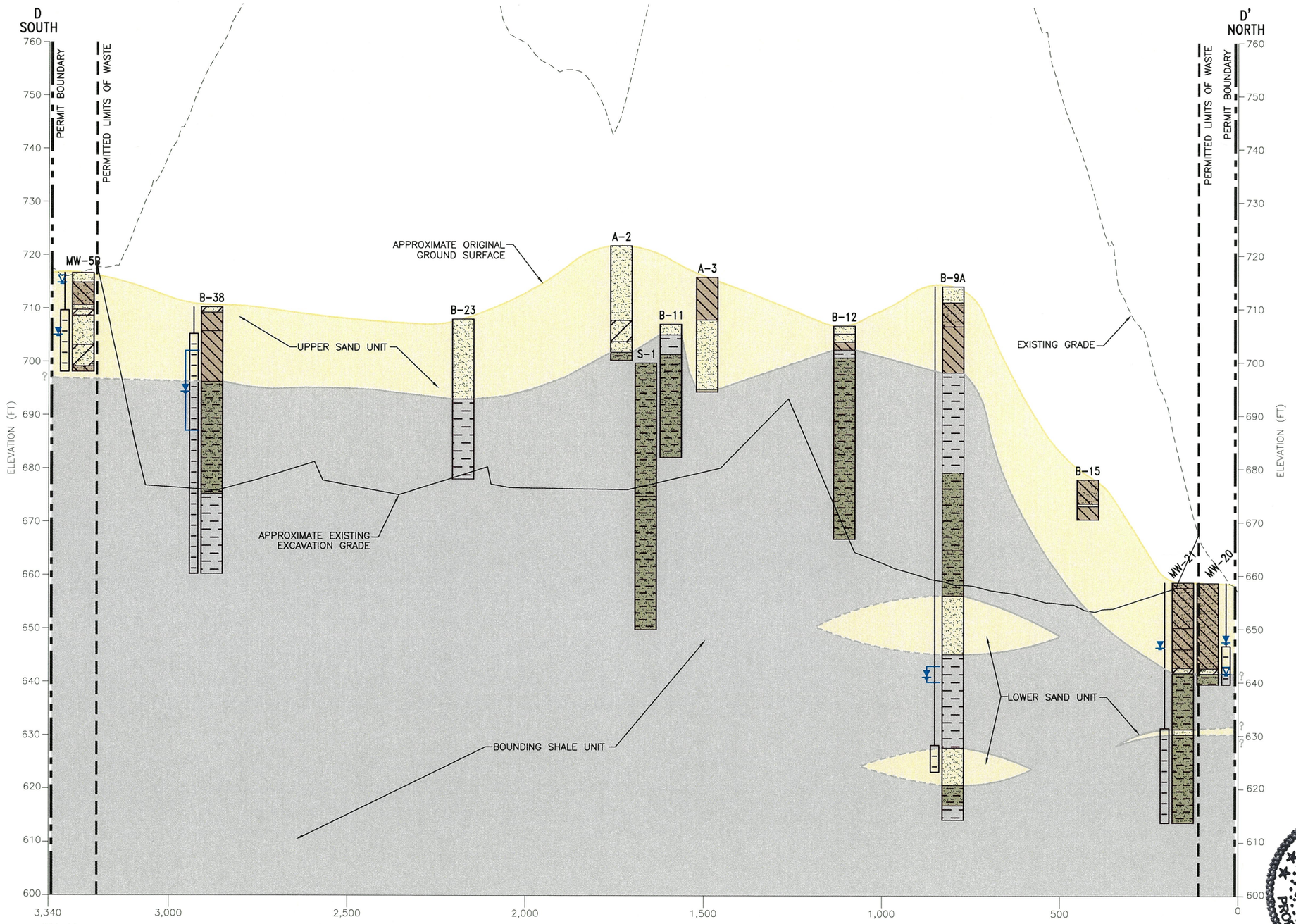
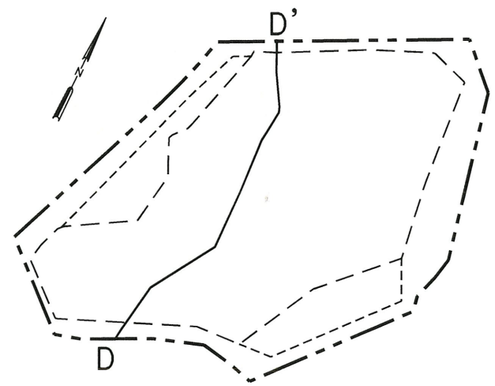
FIGURE IIIG-C-4

0:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-C-2-11_CROSS SECTIONS.dwg, rarrington, 1:2





SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SHALY SAND or SHALY SANDSTOI
- SAND or SANDSTONE
- SANDY SHALE
- CLAY
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

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NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION D-D'

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FIGURE IIIG-C-5

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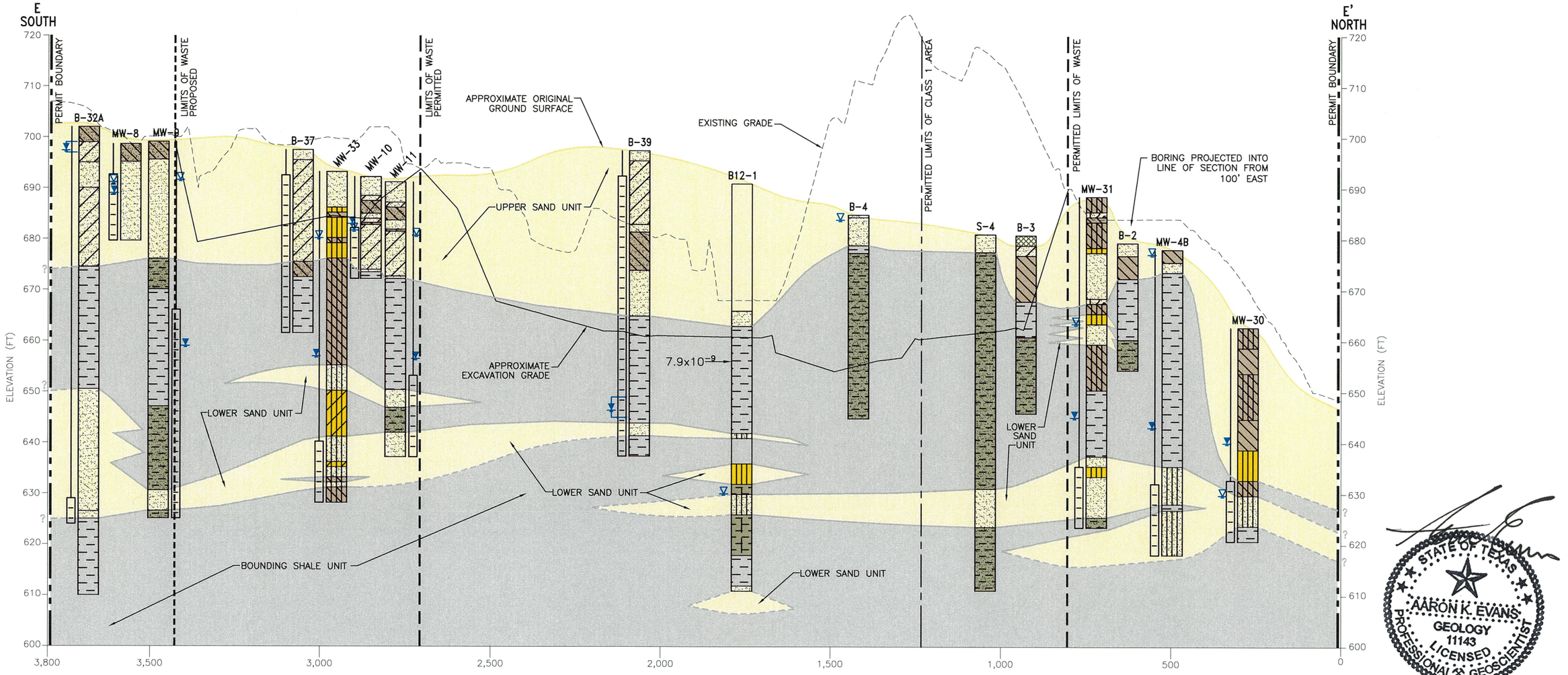

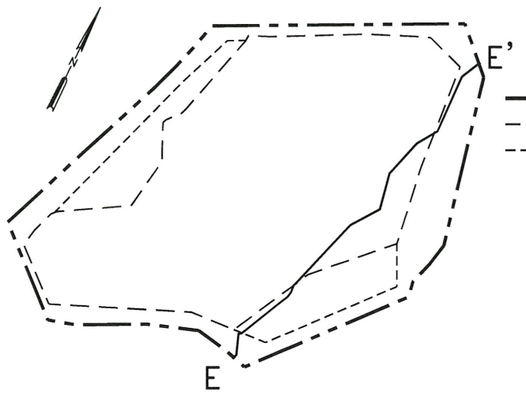

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

$7.9x10^{-9}$ LABORATORY VERTICAL PERMEABILITY (cm/sec) FROM APRIL 2012 SUBSURFACE INVESTIGATION BY THE CAREL CORPORATION.

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

- SANDY CLAY
- SHALE or SILTY SHALE
- SAND or SANDSTONE
- CLAY
- CLAYEY SILT
- CLAYEY SAND
- SILTY CLAY
- SILTY SAND
- SILT or SILTSTONE
- EARTHEN FILL
- SHALY SAND or SHALY SANDSTONE
- GRAVEL or SANDY GRAVEL
- SANDY SHALE
- NOT LOGGED

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION E-E'

TURKEY CREEK LANDFILL
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FIGURE IIIG-C-6

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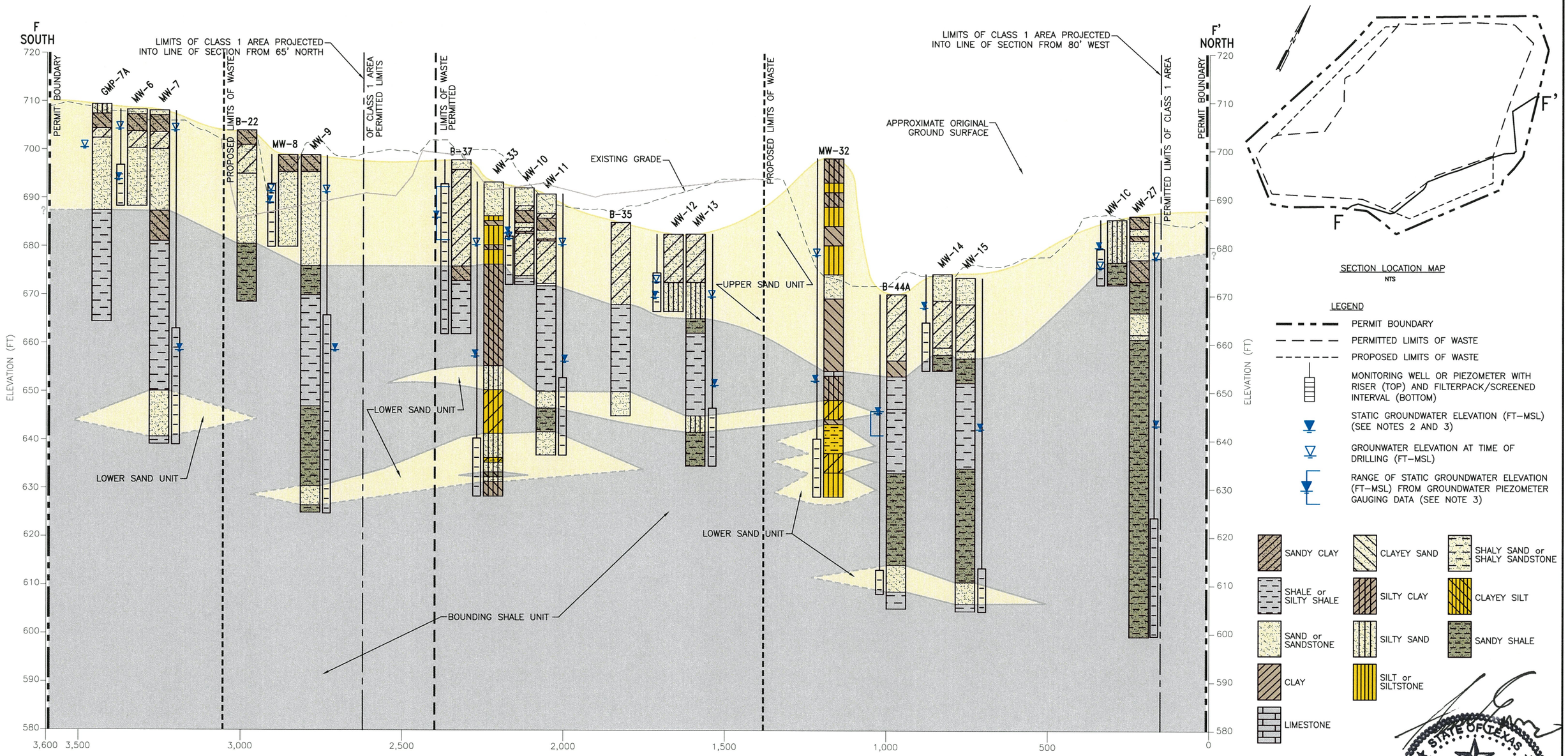

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

- SANDY CLAY
- CLAYEY SAND
- SHALY SAND or SHALY SANDSTONE
- SHALE or SILTY SHALE
- SILTY CLAY
- CLAYEY SILT
- SAND or SANDSTONE
- SILTY SAND
- SANDY SHALE
- CLAY
- SILT or SILTSTONE
- LIMESTONE

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION F-F'

TURKEY CREEK LANDFILL
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FIGURE IIIG-C-7

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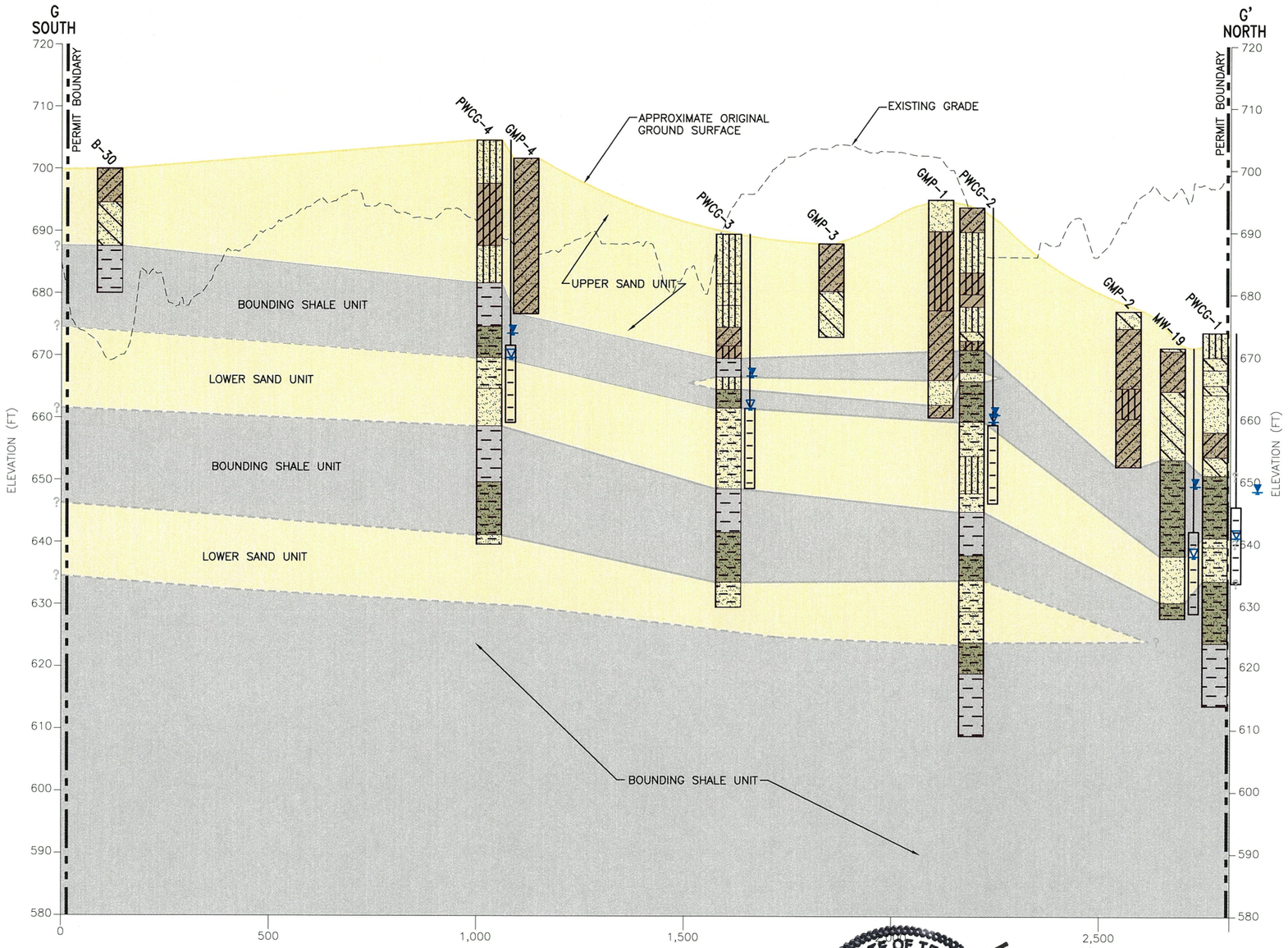

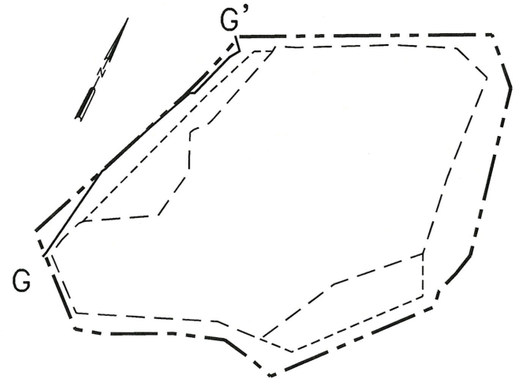

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT–MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT–MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT–MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND OR SILTY SANDSTONE
- SAND or SANDSTONE
- SILT OR SILTSTONE
- CLAY
- SHALY SAND or SHALY SANDSTONE

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
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0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

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FIGURE IIIG–C–8

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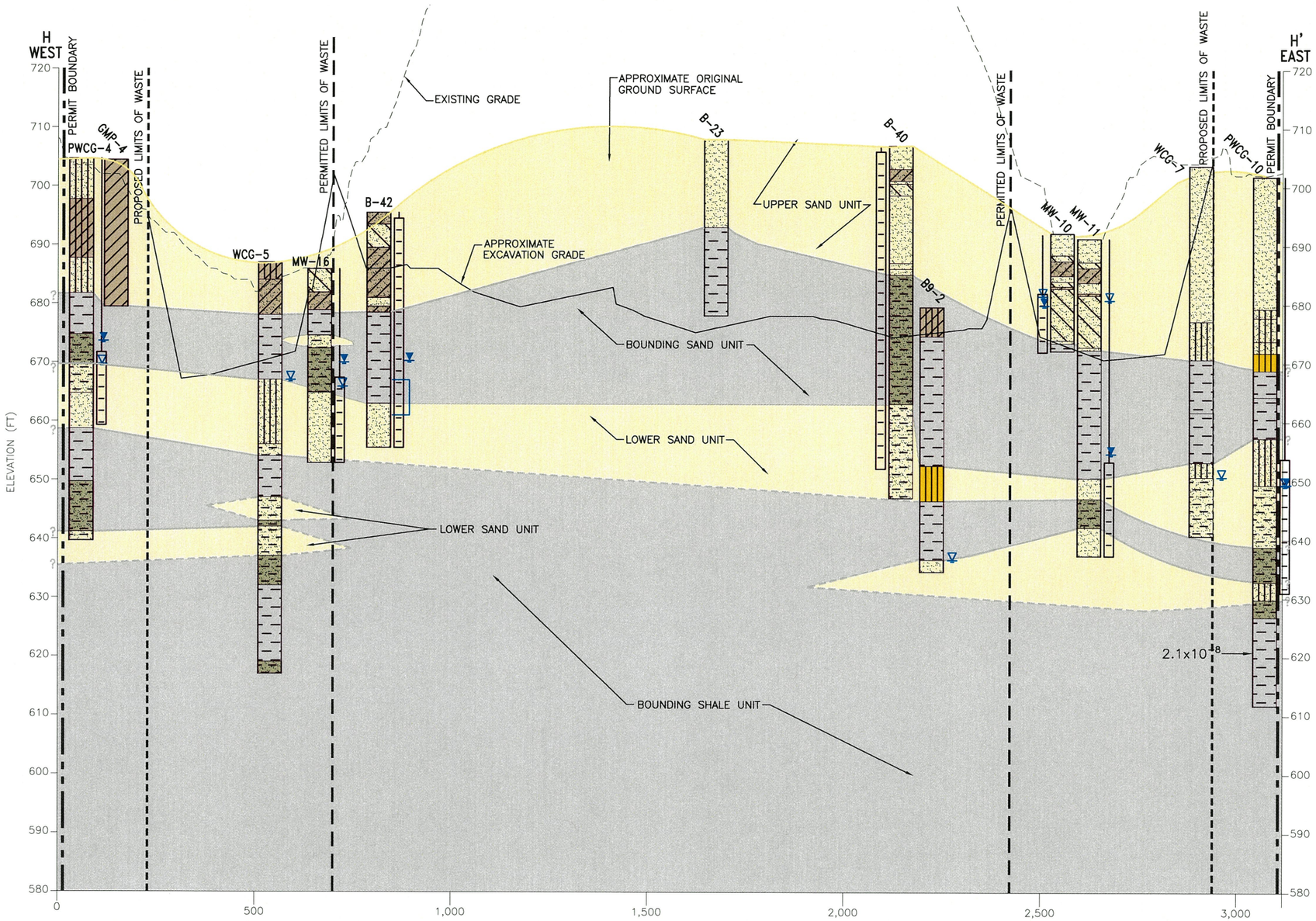

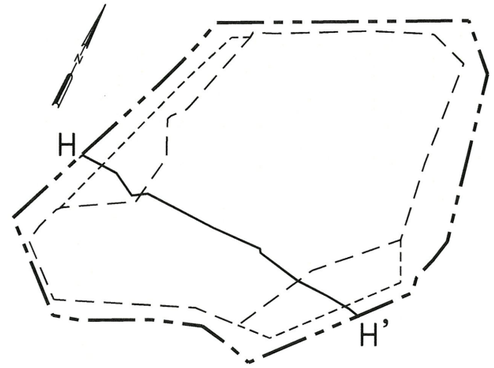

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND OR SILTY SANDSTONE
- SAND or SANDSTONE
- SILT OR SILTSTONE
- CLAY
- SHALY SAND or SHALY SANDSTONE

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
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0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

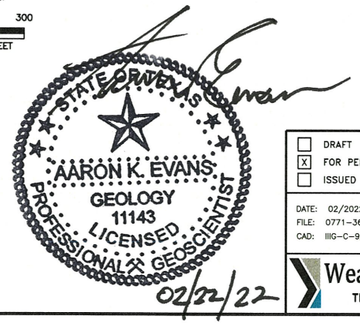

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FIGURE IIIG-C-9

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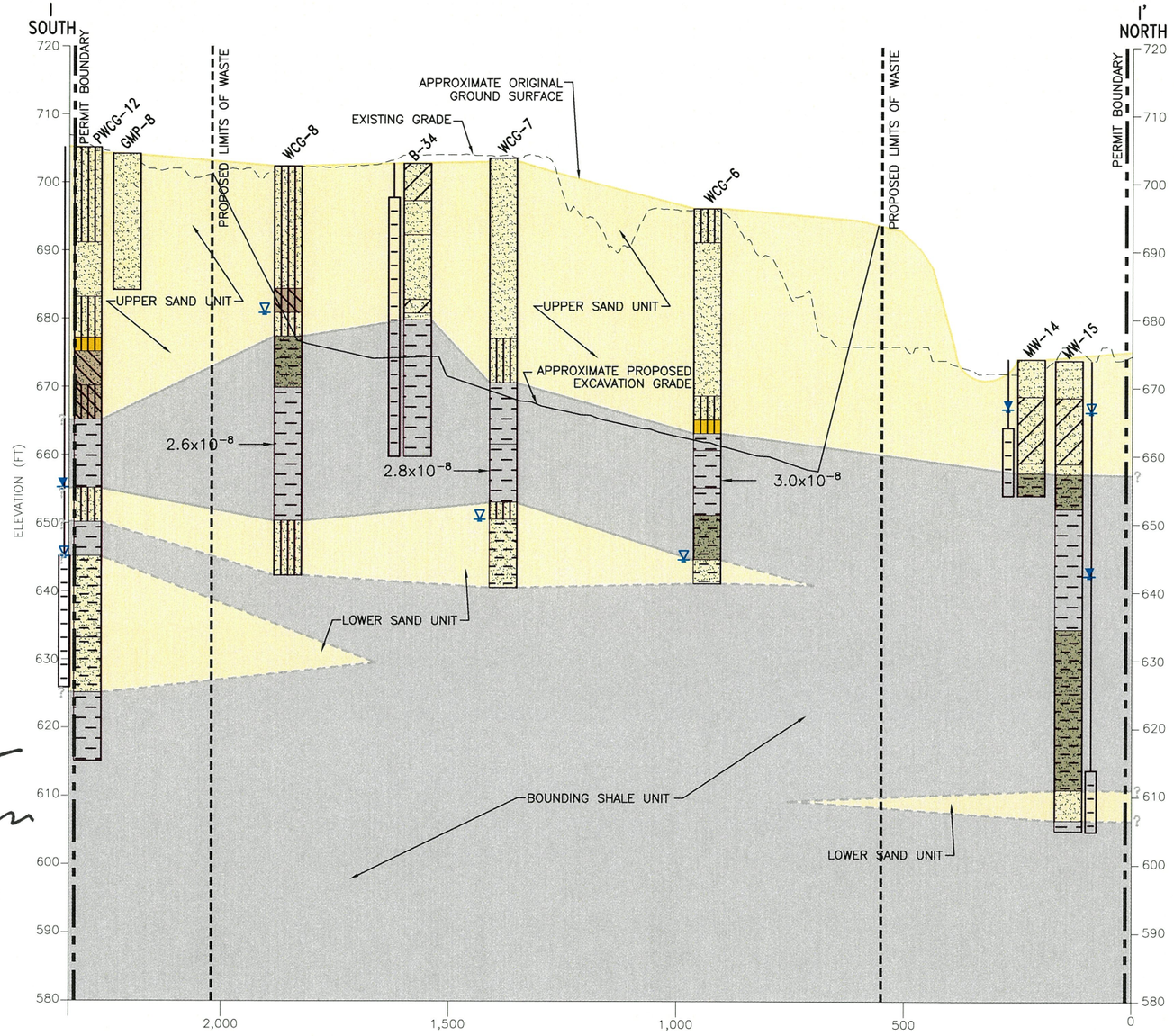
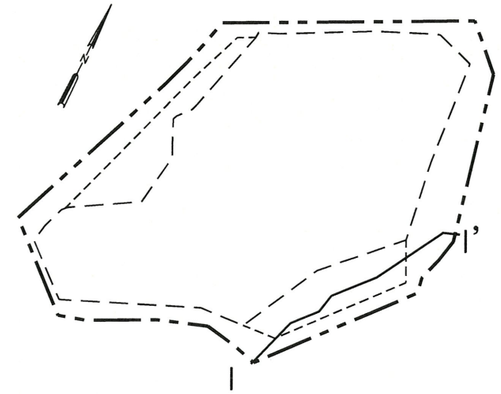
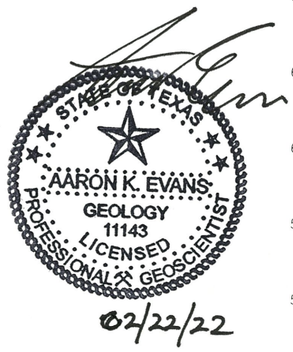




SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)
- $3.0x10^{-8}$ LABORATORY VERTICAL PERMEABILITY (cm/sec) FROM APRIL 2021 SUBSURFACE INVESTIGATION BY WCG.
- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND OR SILTY SANDSTONE
- SAND or SANDSTONE
- SILT OR SILTSTONE
- CLAY



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NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-1.
5. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

0 10 20
VERTICAL SCALE IN FEET

0 150 300
HORIZONTAL SCALE IN FEET

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FIGURE IIIG-C-10

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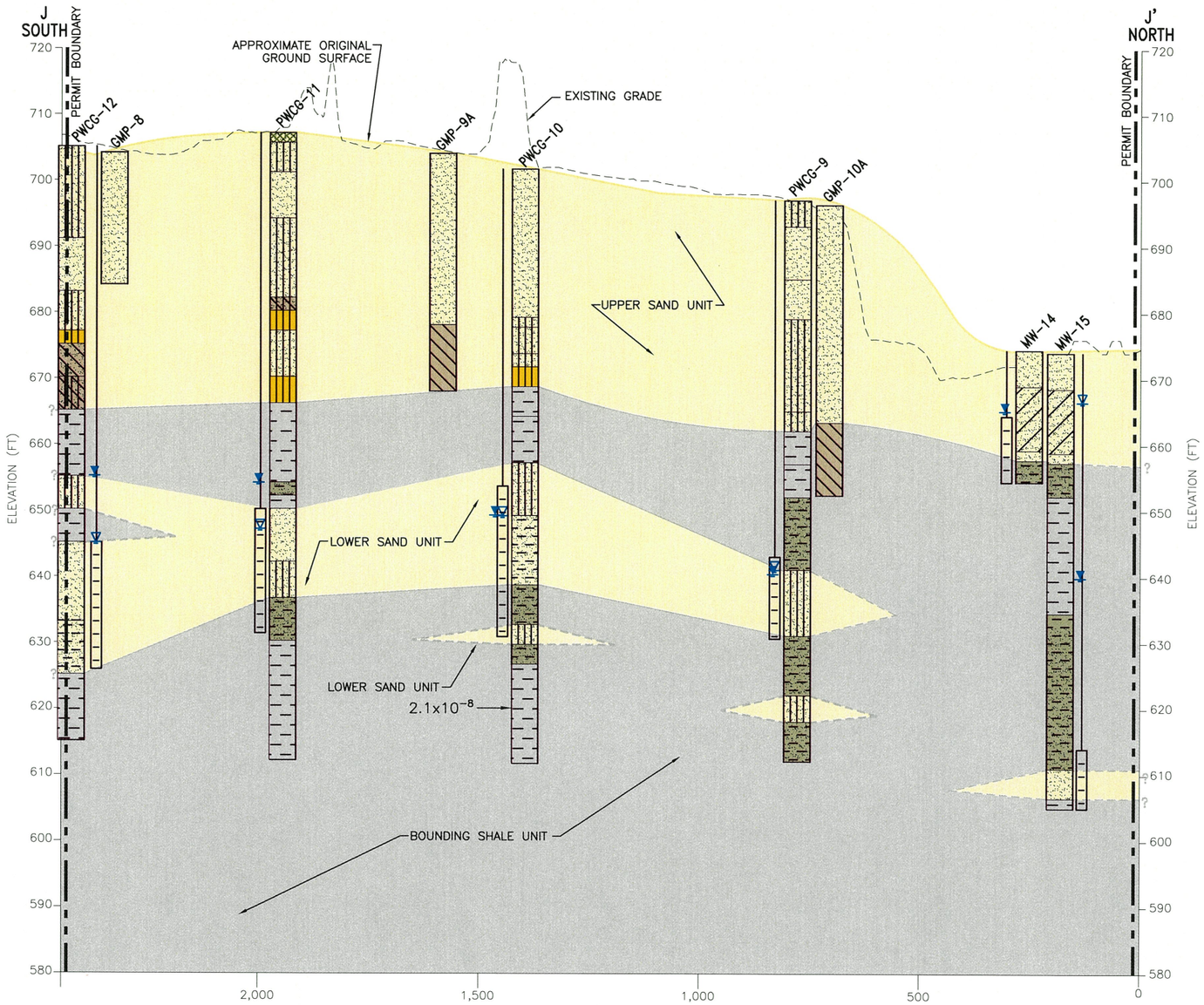

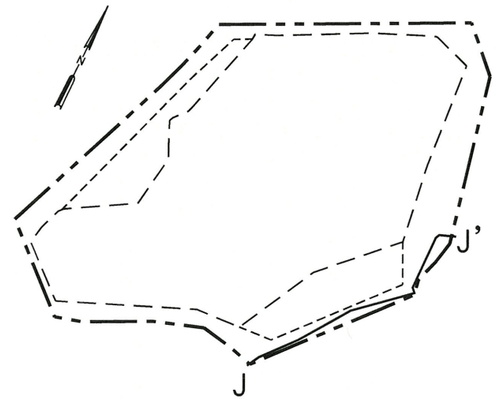

SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- MONITORING WELL OR PIEZOMETER WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2 AND 3)
- GROUNWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)
- $2.1x10^{-8}$ LABORATORY VERTICAL PERMEABILITY (cm/sec) FROM APRIL 2021 SUBSURFACE INVESTIGATION BY WCG.

- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND OR SILTY SANDSTONE
- SAND or SANDSTONE
- SILT OR SILTSTONE
- CLAY
- SHALY SAND or SHALY SANDSTONE

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES AND AS-BUILT SURVEY REPORTS OR GAUGING COMPLETED BY WCG IN SEPTEMBER 2021.
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6. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

0 10 20
VERTICAL SCALE IN FEET
0 150 300
HORIZONTAL SCALE IN FEET

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MAJOR PERMIT AMENDMENT
GEOLOGIC CROSS SECTION J-J'

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FIGURE IIIG-C-11

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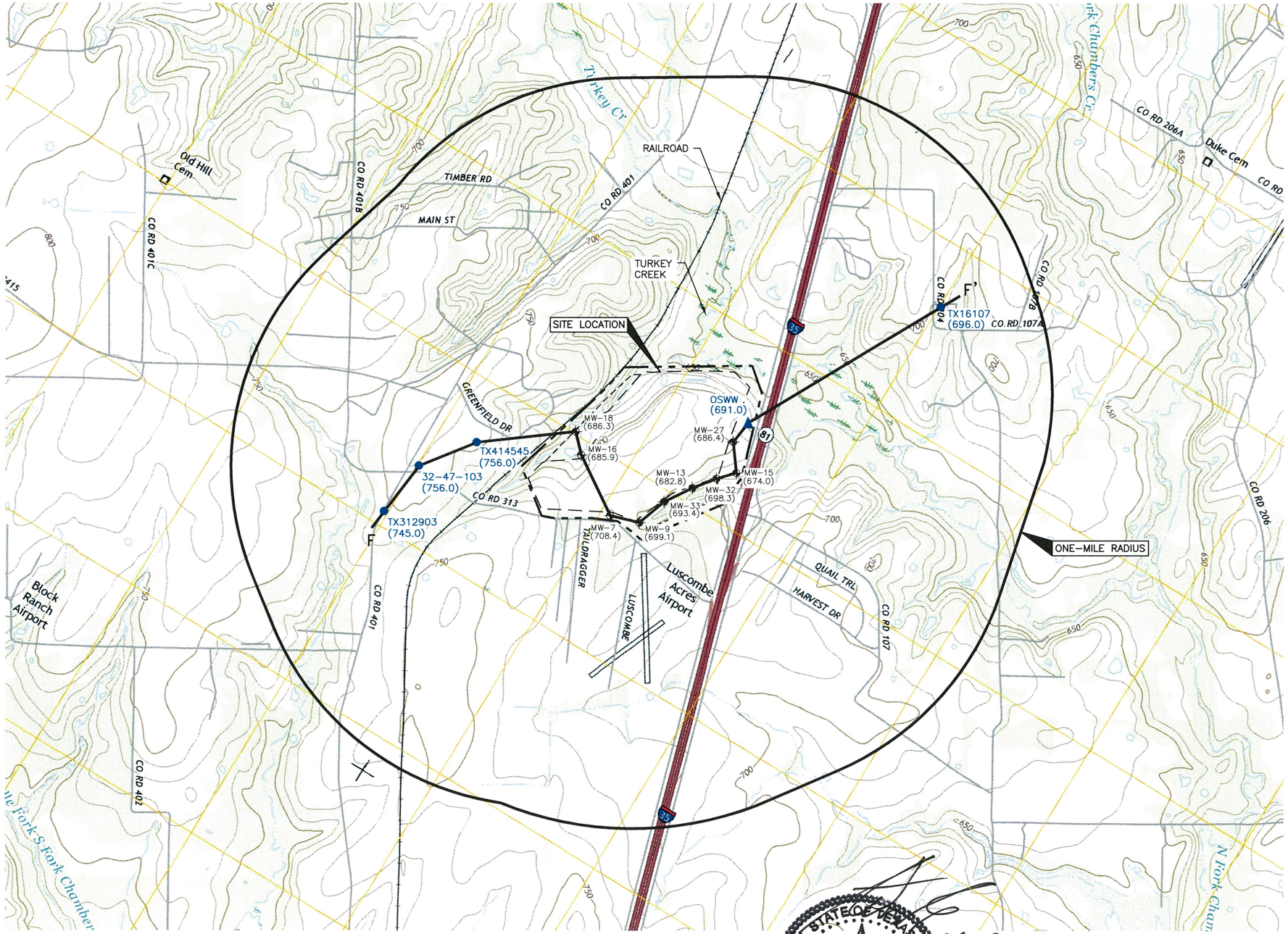

N

0 1000 2000
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE

ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD

Interstate Route · US Route · State Route

- MW-33 (693.4) — EXISTING GROUNDWATER MONITORING WELL
- TX312903 (745.0) — OFFSITE WATER WELL
- OSWW (691.0) — EXISTING ON-SITE WATER WELL (SEE NOTE 4)
- F — F' — EXPANDED GEOLOGIC CROSS SECTION LOCATION

ALVARADO, TX
2016

GRANDVIEW, TX
2016

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 14S
10 000-foot ticks: Texas Coordinate System of 1983 (north central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2014
Roads..... U.S. Census Bureau, 2014 - 2015
Names.....GNIS, 2015
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2004
Boundaries.....Multiple sources; see metadata file 1972 - 2015

Wetlands.....FWS National Wetlands Inventory 1977 - 2014

NOTE:

1. SITE LOCATION BASE MAP ACQUIRED FROM USGS 7-5 MINUTE TOPOGRAPHIC QUADRANGLE MAPS REFERENCED ABOVE.
2. BOREHOLE LOCATIONS AND SURFACE ELEVATIONS OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION LITHOLOGIC LOGS AND REPORTS.
3. OFFSITE WATER WELL LOCATIONS AND INFORMATION OBTAINED FROM, SSDRD AND TWDB INTERACTIVE DATABASE VIEWER AND MODIFIED BASED ON REVIEW OF INDIVIDUAL WATERWELL REPORTS AND GOOGLE EARTH AERIAL IMAGES.
4. ONSITE WATERWELL LOCATION AND INFORMATION OBTAINED FROM HISTORICAL SITE MAP AND WATERWELL REPORT IN FACILITY RECORDS.

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MAJOR PERMIT AMENDMENT
EXPANDED GEOLOGIC CROSS SECTION F-F' INDEX MAP

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FIGURE IIIG-C-12

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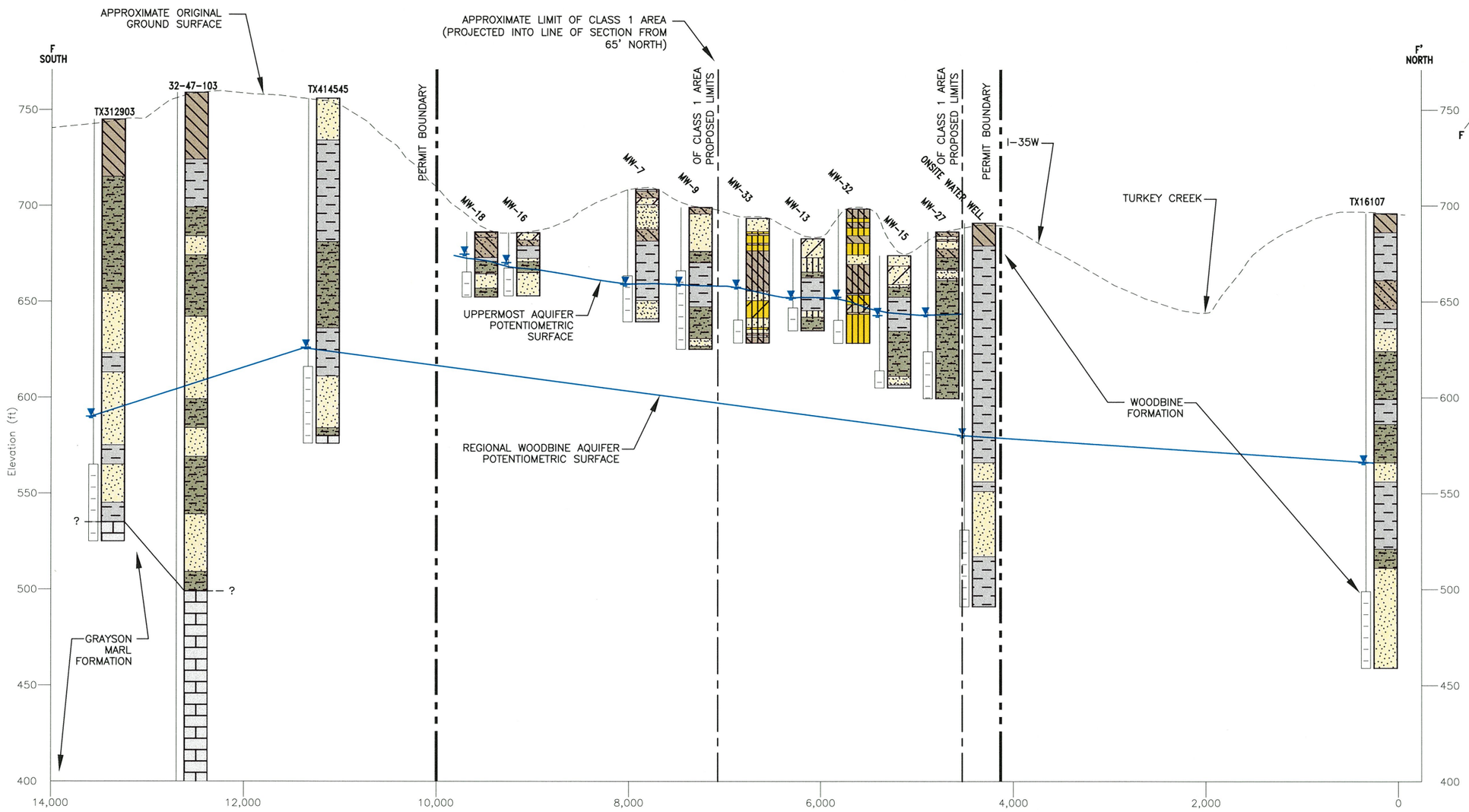
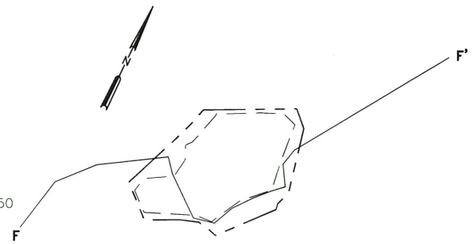
O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-C-12-SECTION MAP.dwg, farrington, 1:2





SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- MONITORING WELL OR WATER WELL WITH RISER (TOP) AND FILTERPACK/SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) (SEE NOTES 2, 3, AND 4)
- SANDY CLAY
- CLAYEY SAND
- SHALE or SILTY SHALE
- SILTY CLAY
- LIMESTONE OR MARL
- SILTY SAND
- SANDY SHALE
- SILT OR SILT STONE
- SAND OR SANDSTONE
- CLAYEY SILT
- CLAY



NOTES:

1. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE IIIG-C-8.
2. MONITORING WELL INFORMATION OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION LITHOLOGIC LOGS AND REPORTS.
3. MONITORING WELL STATIC GROUNDWATER ELEVATIONS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED AND PROVIDED BY THE CAREL CORPORATION.
4. OFFSITE WATER WELL INFORMATION OBTAINED FROM TWDB AND TCEQ DATABASE RECORDS.
5. ONSITE WATER WELL INFORMATION OBTAINED FROM WATER WELL REPORT DOCUMENTED IN THE GROUNDWATER MONITORING PLAN BY EMCON (1994).
6. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
7. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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REVIEWED BY: NT

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MAJOR PERMIT AMENDMENT EXPANDED GEOLOGIC CROSS SECTION F-F'

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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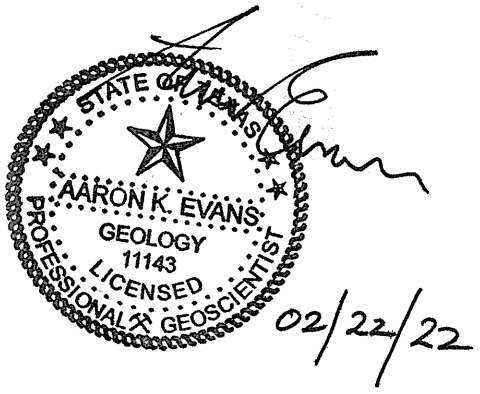
FIGURE IIIG-C-13

O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-C-13-EXTENDED SECTION.dwg, rarrington, 1:2

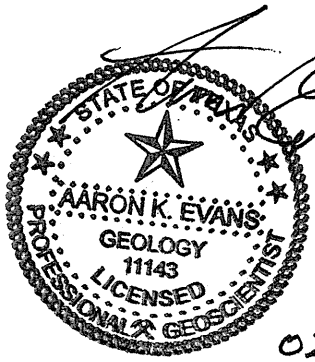
APPENDIX IIIG-D

SITE HYDROGEOLOGIC DATA



CONTENTS

FIGURE IIIG-D-1 – March 2021 Groundwater Potentiometric Surface Contour Map
FIGURE IIIG-D-2 – September 2021 Groundwater Potentiometric Surface Contour Map
FIGURE IIIG-D-3 – Highest Measured Groundwater Elevation Map
FIGURE IIIG-D-4 – Class 1 Disposal Area Top of Uppermost Aquifer Structural Contour Map
1986 Baker-Shiflett Groundwater Elevation Data IIIG-D-5
1991 Baker-Shiflett Groundwater Elevation Data IIIG-D-7
1994 EMCON Groundwater Elevation Data IIIG-D-9
1981 Baker-Shiflett Permeability Data Summary IIIG-D-11
1991 Baker-Shiflett Slug Test Data Summary IIIG-D-13
2012 The Carel Corporation Laboratory Permeability Data Summary IIIG-D-15
April 2012 Subsurface Characterization Report by The Carel Corporation IIIG-D-17
2021 Subsurface Investigation Slug Test Reports by Weaver Consultants Group IIIG-D-90



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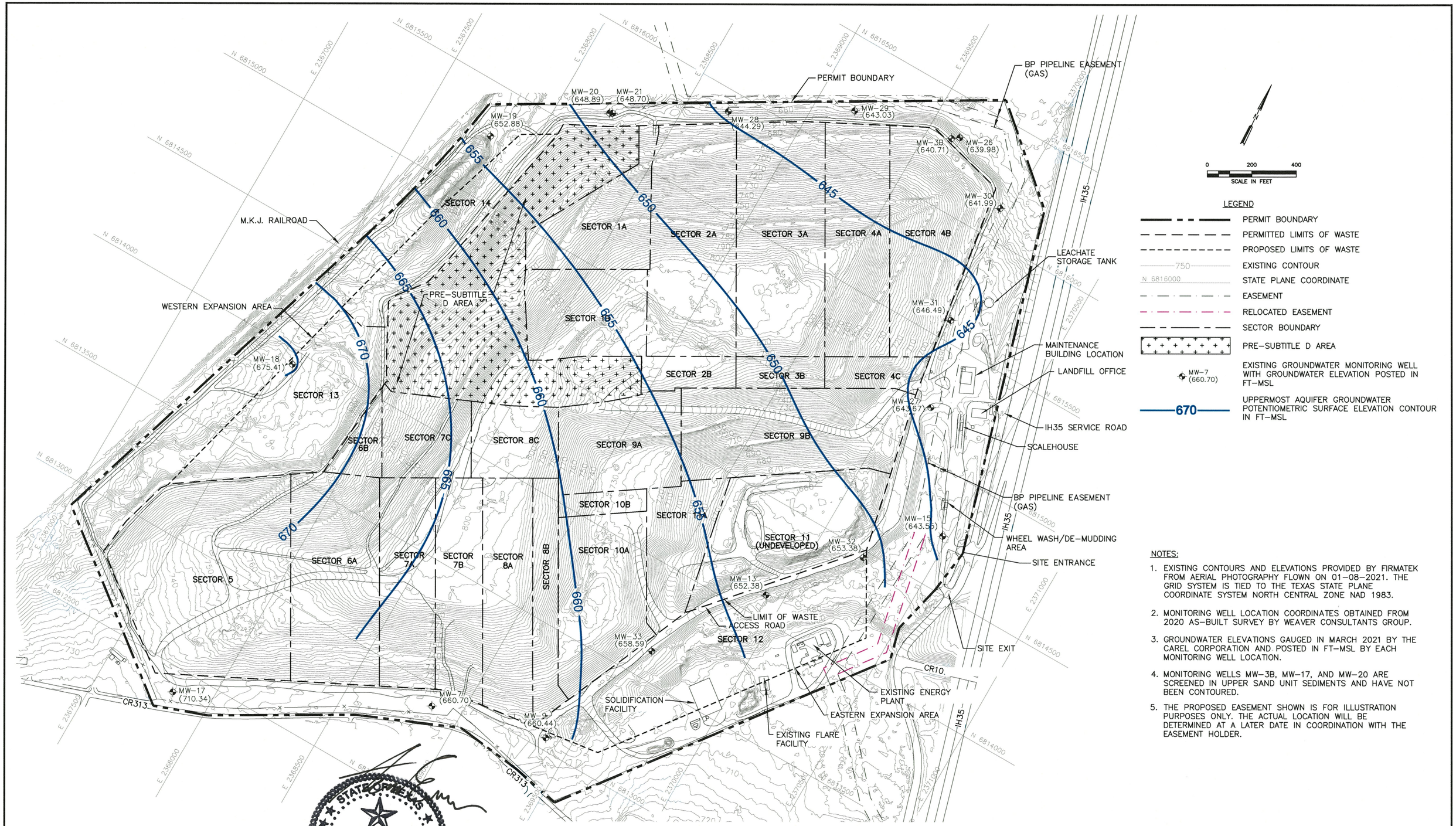
PERMIT BOUNDARY
BP PIPELINE EASEMENT (GAS)
MW-20 (648.89)
MW-21 (648.70)
MW-19 (652.88)
MW-28 (644.29)
MW-29 (643.03)
MW-3B (640.71)
MW-26 (639.98)
MW-30 (641.99)
IH35
M.K.J. RAILROAD
SECTOR 14
SECTOR 1A
SECTOR 2A
SECTOR 3A
SECTOR 4A
SECTOR 4B
LEACHATE STORAGE TANK
WESTERN EXPANSION AREA
PRE-SUBTITLE D AREA
SECTOR 1B
MW-31 (646.49)
MW-18 (675.41)
SECTOR 13
SECTOR 2B
SECTOR 3B
SECTOR 4C
MAINTENANCE BUILDING LOCATION
LANDFILL OFFICE
MW-27 (643.67)
IH35 SERVICE ROAD
SCALEHOUSE
SECTOR 6B
SECTOR 7C
SECTOR 8C
SECTOR 9A
SECTOR 9B
BP PIPELINE EASEMENT (GAS)
SECTOR 10B
SECTOR 11A
MW-15 (643.55)
WHEEL WASH/DE-MUDDING AREA
SECTOR 11 (UNDEVELOPED)
MW-32 (653.38)
SECTOR 6A
SECTOR 7A
SECTOR 7B
SECTOR 8A
SECTOR 8B
SECTOR 10A
SECTOR 5
MW-13 (652.38)
SITE ENTRANCE
LIMIT OF WASTE ACCESS ROAD
MW-33 (658.59)
SECTOR 12
SITE EXIT
CR313
MW-17 (710.34)
MW-7 (660.70)
MW-9 (660.44)
SOLIDIFICATION FACILITY
CR10
EXISTING ENERGY PLANT
EASTERN EXPANSION AREA
EXISTING FLARE FACILITY
655
660
665
670
650
645
600
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
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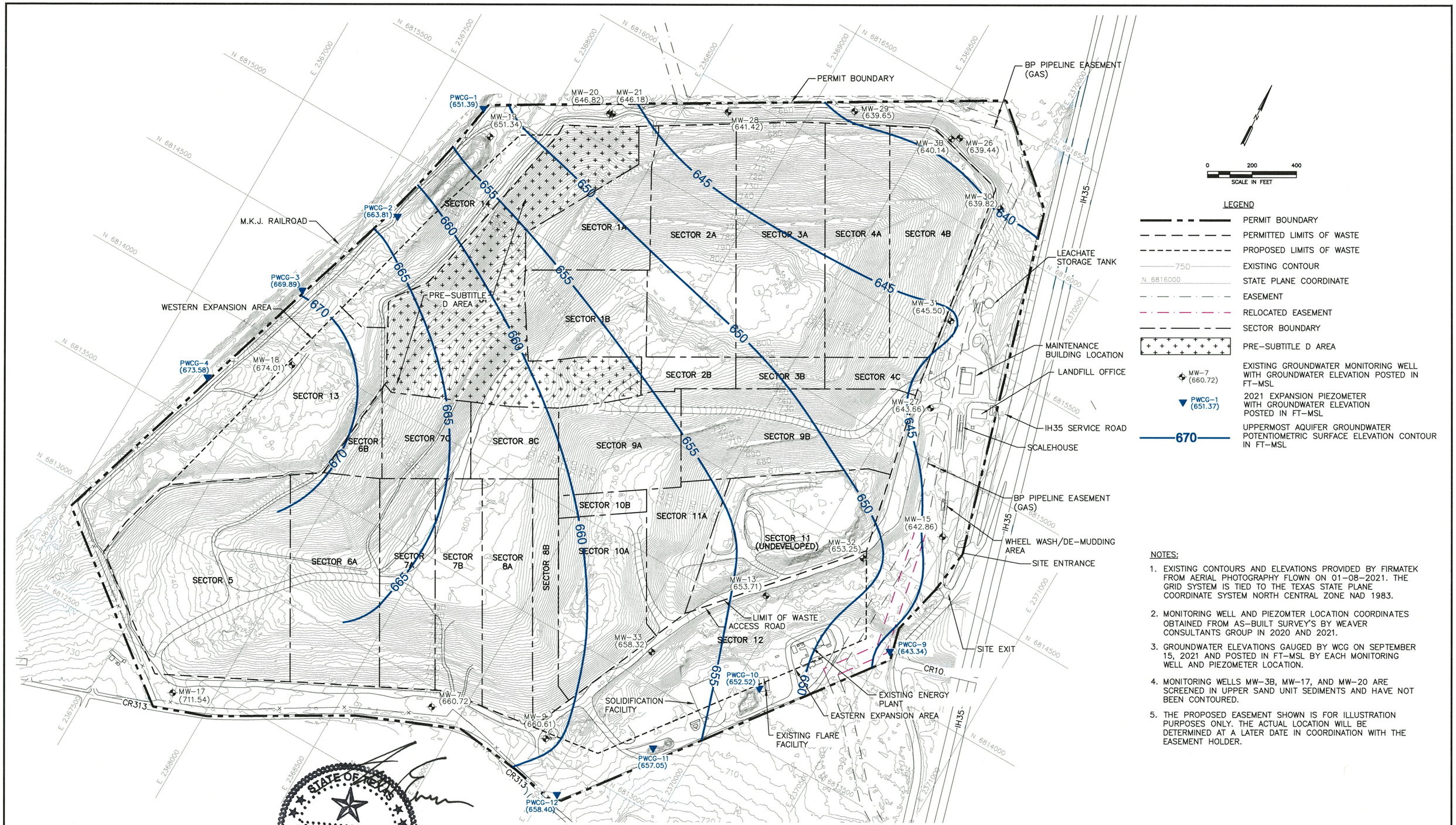
850
855
860
865
870



NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. MONITORING WELL AND PIEZOMTER LOCATION COORDINATES OBTAINED FROM AS-BUILT SURVEY'S BY WEAVER CONSULTANTS GROUP IN 2020 AND 2021.
3. GROUNDWATER ELEVATIONS GAUGED BY WCG ON SEPTEMBER 15, 2021 AND POSTED IN FT-MSL BY EACH MONITORING WELL AND PIEZOMETER LOCATION.
4. MONITORING WELLS MW-3B, MW-17, AND MW-20 ARE SCREENED IN UPPER SAND UNIT SEDIMENTS AND HAVE NOT BEEN CONTOURED.
5. THE PROPOSED EASEMENT SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THE ACTUAL LOCATION WILL BE DETERMINED AT A LATER DATE IN COORDINATION WITH THE EASEMENT HOLDER.

STATE OF TEXAS
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DESIGN BY: AKE
REVIEWED BY: NT

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PREPARED FOR
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MAJOR PERMIT AMENDMENT SEPTEMBER 2021 GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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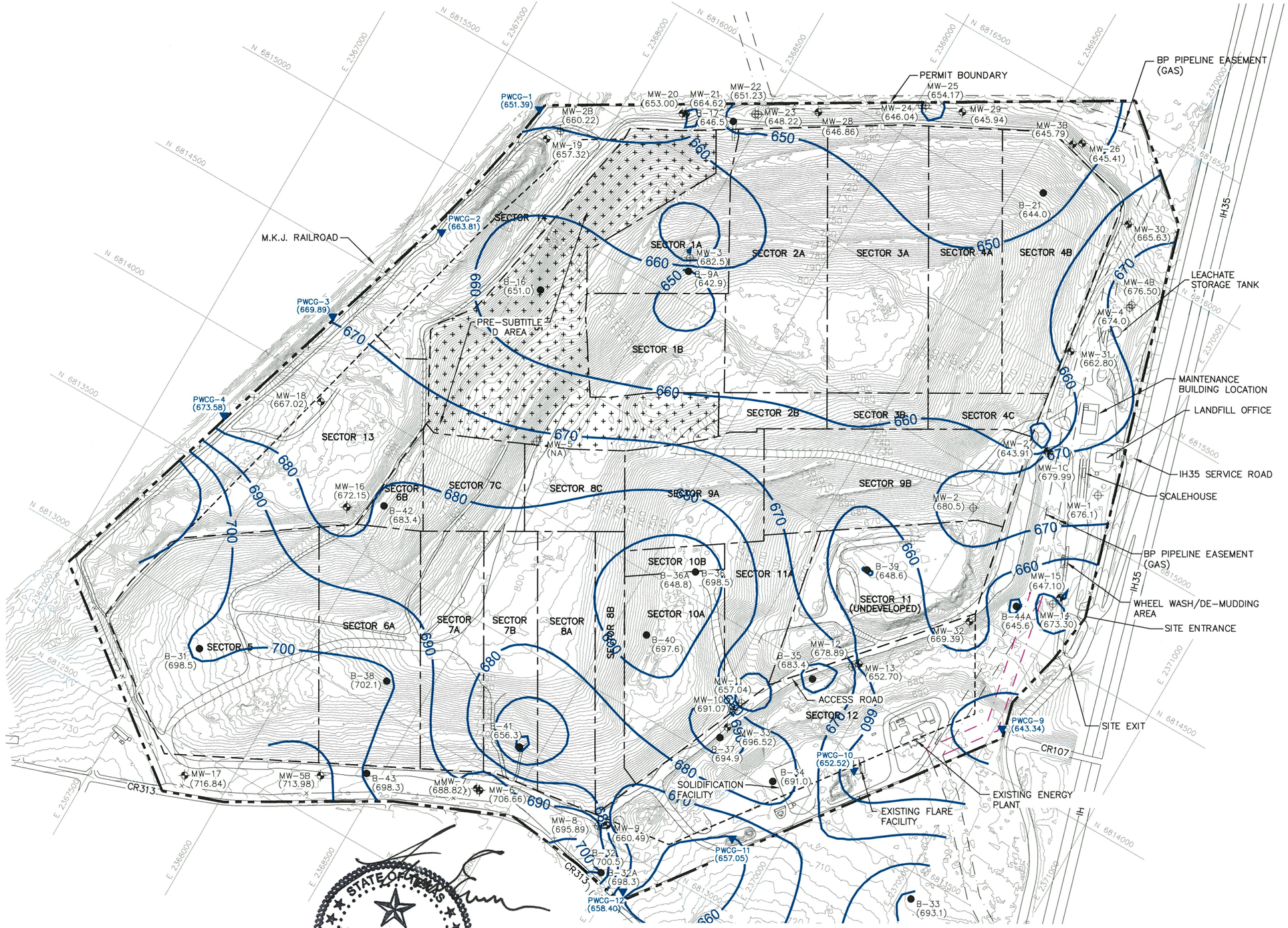
FIGURE IIIG-D-2

O:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-D-2-SEPTEMBER 2021 GW.dwg, rarrington, 1:2



LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- 750 — EXISTING CONTOUR
- N 6816000 — STATE PLANE COORDINATE
- 32° 21' 20" — GEODETIC COORDINATE
- EASEMENT
- RELOCATED EASEMENT (SEE NOTE 5)
- SECTOR BOUNDARY
- PRE-SUBTITLE D AREA
- MW-7 (688.82) — EXISTING GROUNDWATER MONITORING WELL WITH HIGHEST MEASURED GROUNDWATER ELEVATION POSTED IN FT-MSL
- MW-1 (676.1) — FORMER GROUNDWATER MONITORING WELL WITH HIGHEST MEASURED GROUNDWATER ELEVATION POSTED IN FT-MSL
- B-44A (645.6) — FORMER GROUNDWATER PIEZOMETER WITH HIGHEST MEASURED GROUNDWATER ELEVATION POSTED IN FT-MSL
- PWCG-1 (651.37) — 2021 EXPANSION PIEZOMETER WITH GROUNDWATER ELEVATION POSTED IN FT-MSL
- 670 — HIGHEST MEASURED GROUNDWATER ELEVATION CONTOUR IN FT-MSL (SEE NOTE 4)

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. MONITORING WELL AND PIEZOMETER LOCATION COORDINATES OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION BORING LOGS, INVESTIGATION REPORTS, INSTALLATION REPORTS, AND AS-BUILT SURVEY REPORTS.
3. GROUNDWATER ELEVATION DATA OBTAINED FROM THE FACILITY'S SUBTITLE D GROUNDWATER MONITORING DATABASE PROVIDED BY THE CAREL CORPORATION IN OCTOBER 2021 FROM PREVIOUS SUBSURFACE EXPLORATION AND INVESTIGATION REPORTS, AND FROM GAUGING CONDUCTED BY WCG IN 2021.
4. GROUNDWATER CONTOURS WERE PRODUCED USING EACH WELLS HIGHEST MEASURED GROUNDWATER ELEVATION AND DO NOT REPRESENT A SINGLE GROUNDWATER MONITORING EVENT OR ACTUAL GROUNDWATER FLOW.
5. THE PROPOSED EASEMENT SHOWN IS FOR ILLUSTRATION PURPOSES ONLY. THE ACTUAL LOCATION WILL BE DETERMINED AT A LATER DATE IN COORDINATION WITH THE EASEMENT HOLDER.

STATE OF TEXAS
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MAJOR PERMIT AMENDMENT HIGHEST MEASURED GROUNDWATER ELEVATION MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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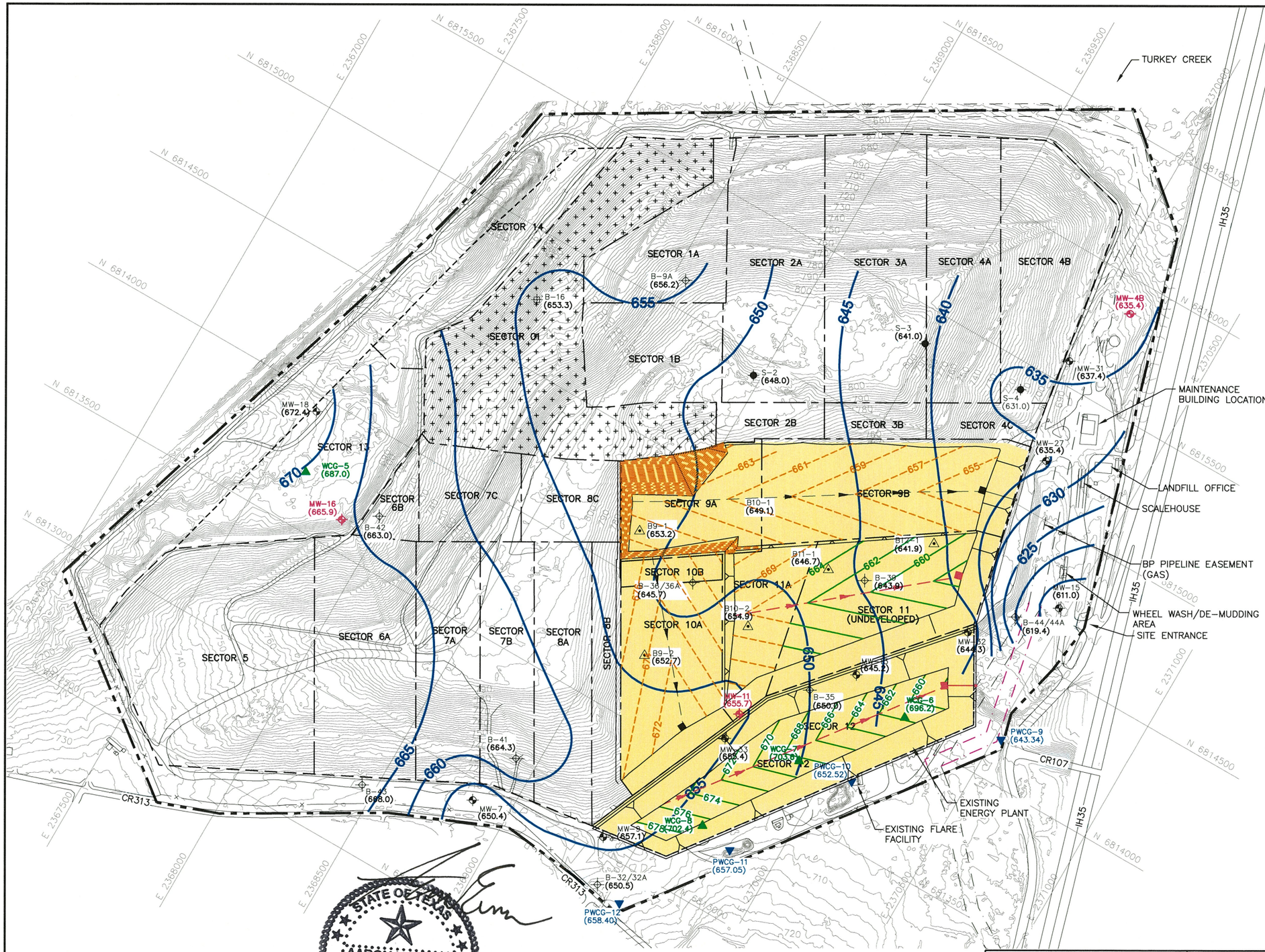
FIGURE IIIG-D-3

0:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-D-3-HIGHEST MEASURED GW.dwg, rarrington, 1:2



LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- 730 — EXISTING CONTOUR
- N 6816000 — STATE PLANE COORDINATE
- PRE-SUBTITLE D AREA
- PERMITTED CLASS I WASTE AREA
- MW-7 (650.4) — EXISTING GROUNDWATER MONITORING WELL
- MW-4B (635.4) — FORMER GROUNDWATER MONITORING WELL
- S-2 (648.0) — 1984 BAKER-SHIFLETT BORING
- B-39 (643.9) — 1988-1991 BAKER-SHIFLETT BORING
- B10-2 (654.92) — 2012 CAREL CORPORATION BORING
- B-16 (653.3) — 1986 BAKER-SHIFLETT BORING
- WCG-8 (702.4) — 2021 WCG EXPANSION BORING
- PWCG-9 (643.34) — 2021 WCG EXPANSION BORING WITH PIEZOMETER INSTALLATION
- 660 — TOP OF UPPERMOST AQUIFER HYDROSTRATIGRAPHIC STRUCTURAL CONTOUR (SEE NOTES 2 AND 3)
- 662 — PERMITTED/UNDEVELOPED EXCAVATION CONTOUR
- 670 — PERMITTED/EXISTING TOP OF LINER CONTOUR
- PERMITTED/EXISTING LEACHATE LINE
- PERMITTED/UNDEVELOPED LEACHATE LINE
- PERMITTED/EXISTING SUMP
- PERMITTED/UNDEVELOPED SUMP

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. BOREHOLE LOCATION COORDINATES AND SURFACE ELEVATIONS OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION LITHOLOGIC LOGS AND REPORTS.
3. TOP OF UPPERMOST AQUIFER HYDROSTRATIGRAPHIC STRUCTURAL ELEVATIONS OBTAINED FROM LITHOLOGIC LOGS AND POSTED AT EACH BOREHOLE LOCATION IN FT-MSL.

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MAJOR PERMIT AMENDMENT
CLASS 1 DISPOSAL AREA
TOP OF UPPERMOST AQUIFER STRUCTURAL CONTOUR MAP
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE IIIG-D-4

0:\0771\368\EXPANSION 2021\PART III\IIIG\IIIG-D-4-UPPERMOST AQUIFER.dwg, rarrington, 1:2

1986 BAKER-SHIFLETT
GROUNDWATER ELEVATION DATA

BAKER-SHIFLETT, INC.

JOHNSON COUNTY SANITARY LANDFILL

SUPPLEMENTAL GEOTECHNICAL STUDY
GROUNDWATER MEASUREMENTS - ELEVATIONS

Boring No.	Date									
	2-26-86	3-4-86	3-24-86	5-16-86	5-21-86	5-29-86	6-6-86	6-12-86	6-18-86	6-23-86
16	651.0	644.0	643.0	648.5	647.0	646.5	648.0	648.5	647.5	647.0
17	628.0	638.5	638.5	641.5	643.5	643.5	644.5	646.5	646.5	645.5
21	---	---	---	644.0	643.0	642.0	643.5	644.0	643.0	642.0

	7-3-86	7-16-86	8-6-86	10-7-86	10-17-86	11-11-86	1-15-87
16	647.5	646.5	645.0	644.0	644.0	645.0	646.0
17	645.5	643.5	641.5	639.0	639.5	640.0	642.0
21	642.0	641.5	639.5	639.0	639.5	641.0	642.0

Note: Groundwater measurements have continued to be made in the temporary piezometers as shown.

Plate 24

1991 BAKER-SHIFLETT
GROUNDWATER ELEVATION DATA

GROUND WATER ELEVATIONS TABLE

JOHNSON COUNTY SANITARY LANDFILL
Johnson County, Texas

Groundwater Elevations
Feet, MSL

	Piezometer No.	B-31	B-32	B-32A	B-33	B-34	B-35	B-36	B-36A	B-37	B-38	B-39	B-40	B-41	B-42	B-43	B-44A	South Well*	MW-1*	MW-2*	MW-4*	B-16	B-17	B-21	MW-1B*	MW-2B*	MW-3*	MW-3B*	B-3A
	Ground Surface Elev.	715.2	701.5	702.0	710.1	702.8	685.0	706.0	705.9	697.9	710.2	697.4	707.0	705.3	695.5	711.4	670.2	731.4	682.0	686.0	691.0	674.9	685.0	668.0	686.2	671.9	715.7	655.9	711.9
	14-Dec-88	697.1	695.5		689.5	686.9	668.7	675.0		681.1	695.4																		
	29-Dec-88	696.4	695.7		689.6	686.8	668.5	674.7		681.0	693.2																		
	28-Dec-88	695.5	695.8		689.6	686.5	668.0	674.4		681.4	693.3																		
	09-Jan-89	694.2	695.8		689.5	686.5	668.2	674.0		681.5	691.2																		
	20-Jan-89	693.4	695.7		689.4	686.5	668.7	673.6		681.9	691.1																		
	27-Jan-89	693.1	695.6		689.3	686.5	668.9	671.9		681.9	691.0																		
	09-Feb-89	689.8	695.7		689.4	686.7	670.4	669.7		682.1	690.9																		
	20-Feb-89	688.9	696.7		689.6	687.0	671.3	670.0		682.2	691.7																		
	13-Mar-89	688.0	698.5		689.8	687.4	671.9	670.3		682.8	692.8				661.7														
	20-Mar-89	692.6	699.0		689.8	687.3	670.0	670.3		683.0	691.5				661.8														
	03-Apr-89	692.4	699.0		689.9	687.9	672.8	670.2		683.7	691.9				661.8			712.0											
	10-Apr-89	690.8	698.4		689.6	687.6	672.7	669.8		683.9	691.6			656.3	661.2	698.8		712.1	675.2	680.5	674.0	648.9		644.0					
	17-Apr-89	691.3	698.1		690.0	686.0	673.4	670.1		684.4	692.7		683.5	654.5	662.2	696.8		712.4											
	27-Apr-89	691.6	695.8		690.2	686.2	673.8	671.7		684.9	687.5	647.6	690.0	654.0	662.2	696.8		709.2											
	02-May-89	690.8	698.1		690.2	686.4	674.0	672.7		685.0	692.1	647.4	690.2	654.1	663.2			712.8	675.7			650.8		643.4					
	12-May-89	691.3	699.4		690.4	686.3	675.6	673.2		685.9	693.1	646.9	690.7	655.6	663.0	697.0		713.4											
DATE	19-May-89	692.7	700.5		690.7	690.5	681.6	675.4		691.1	702.1			654.6	663.4	697.2		713.8	676.1			652.1		645.6					
	26-May-89	692.5	699.6		691.0	693.3	681.5	694.7		689.0	696.4	647.6	693.5	653.9	662.9	697.3		714.4											
	23-Jun-89	693.9	699.2		692.1	690.7	681.5	694.4		688.6	695.9	647.5	693.1	654.1	664.0	697.6		714.5				652.7	647.2	644.3					
	12-Jul-89		698.7		692.6	690.1	679.7	694.1		688.4	696.6	647.0	695.3	653.5	663.7	696.0		714.5				652.4	645.8	642.7					
	03-Aug-89	695.5	697.5		692.8	689.8	677.6	693.5		688.6	696.7	647.6	695.0	654.2	664.5	698.0		714.2				652.4	645.0	642.3					
	17-Aug-89	696.9	698.1		692.7	689.5	677.1	693.1		688.1	695.8		694.7	654.0	664.5	698.2						652.3	644.8	642.8					
	20-Sep-89	696.9	697.0		692.2	689.1	676.4	692.1		686.4	695.7	647.5	693.8	653.7	664.8	696.1		713.6				653.4	641.7	641.7					
	23-Oct-89	697.1	696.6		691.8	688.6	674.5	691.3		685.2	695.5	647.4	693.0	653.9	664.5	697.7		713.1				651.1	642.6	640.2					
	08-Jan-90	696.9	696.9		691.0	688.0	676.0	690.6		687.0	692.2	646.6	692.1	653.3	663.5	697.4		712.4				650.8	642.1	639.9					
	30-Jan-90	696.8	697.5		691.1	688.0	676.0	691.0		687.5	692.3	647.5	692.1	653.4	663.4	697.4		712.3				651.0	645.0	641.7					
	19-Feb-90	695.3	698.4		690.9		676.2	691.1		688.1	692.9	647.5	692.1	653.8	664.3	697.3		714.9											
	22-May-90	695.5	699.7		692.4		683.2	698.5		691.9	697.8		697.6	654.1	666.5	697.9		717.8						643.9					
	30-May-90	695.9	700.1		692.8	691.0	683.4	698.1		691.4	697.9	648.6	697.5	654.2	667.0	697.8		715.9				654.1	647.0	643.8					
	06-Jun-90	696.1	699.3		693.0	690.8	682.7	697.4		691.2	697.7	648.2	697.8	654.2	666.8	697.9		717.8				654.0	646.8	643.7					
	14-Jun-90	699.3	699.6		691.2	690.0	677.1	696.5		694.9	697.6	646.5	696.8	654.3	666.9	698.1		717.7				654.2	646.4	643.1					
	19-Jun-90	696.4	696.2		693.1	690.4	681.6	696.0		689.0	697.5	647.2	696.6	654.4	667.3	698.1		717.5				656.8	645.8	642.5					
	05-Jul-90	696.2	697.3		692.4	690.7	679.4	694.4		686.8	697.0	646.6	694.6	653.0	663.6	697.9		717.1				653.3	644.6	642.2					
	12-Nov-90	695.7	695.5		691.2	688.1	675.6	690.2		682.7	697.0		691.2	653.1	664.9	697.7		717.5				648.1	640.0	637.2					
	30-Nov-90	695.0	696.6		690.7	687.8	673.4	690.4		683.6	696.1	647.7	690.9	652.4	664.1	697.5		714.7		676.4	671.3		640.3	637.5	677.0	651.9	682.5	635.6	
	14-Jan-91	693.9	696.7		690.9	688.0	674.4	690.6		685.1	695.0	647.8	690.6	651.6	664.3	697.2		712.5		676.4	670.6	651.6	640.8	636.5	677.2	651.6	678.9	635.4	
	04-Feb-91	693.7	697.5	697.6	690.9	688.2	675.5	690.2	646.5	685.3	695.1	648.6	690.3	653.3	662.2	695.8	641.5	712.5		679.7	673.2		641.5	640.4	678.9	651.5		636.5	
	07-Feb-91	691.7	697.0	697.3	690.8	687.8	673.4	690.4	648.8	685.3	694.6	647.9	690.4	650.2	662.2	697.3	644.9	712.7		679.8	671.3	652.1	641.7	640.6	678.2	651.7	676.1	638.9	641.6
	01-Mar-91	693.0	696.3	695.3	691.0	688.2	676.7	691.0	646.0	686.0	696.9	647.9	690.7	650.0	664.3	697.5	645.6	712.9		679.8	672.9	652.2	642.2	641.6	679.4	652.3	677.8	639.7	642.9

NOTES:
1) All elevations are rounded to the nearest 0.1 feet.
2) Elevations for MW-1 ,MW-2, B-17, and B-21 are estimated from contour map.

* Elevation is at top of riser.

Plate 11a-C,7

1994 EMCON
GROUNDWATER ELEVATION DATA

Table 2.4.2.4 - Water Level Data

Monitor Well Number	Date	6-26-91	9-25-91	3-31-92	6-30-92	8-20-92	12-1-92	3-16-93	6-15-93	8-18-93	12-15-93	1-28-94	6-7-94
1C								679.80	678.43	677.32	678.64	678.82	
2B		646.80	652.93		656.47				656.51			654.54	656.71
3B		631.80	639.00		642.05				640.48			640.66	641.16
4B				646.39		643.71	642.44		644.64			643.08	645.21
5B						710.12	709.87	713.98	711.67			711.99	712.17
6												702.37	704.16
7												656.60	656.13
8								692.56	694.15	691.51	694.13	695.63	
9								656.10	656.45	655.99	655.63	654.74	
10												684.11	686.83
11												654.56	655.69
12								678.89	677.96	674.11	673.55	674.45	676.64
13								649.61	649.35	649.92	649.85	649.80	
14												667.61	667.97
15												645.86	646.20
16								669.03	669.32	668.68	667.28	667.61	

Note: Complete sets of seasonal high and low water levels are not available. For well depth and other construction information, refer to Table 3.1.2.2. Datum is feet above mean sea level.

1981 BAKER-SHIFLETT
PERMEABILITY DATA SUMMARY

JOHNSON COUNTY SANITARY LANDFILL, INC.

SUMMARY OF PERMEABILITY DETERMINATIONS

LABORATORY TEST RESULTS

Boring No.	Depth, ft.	"K" (cm/sec)	Description
B-1	15.0 - 16.5	3.8×10^{-8} Horiz.	Gray shale - firm
B-2	4.5 - 5.5	2×10^{-7}	Gray shaly clay w/tan & gray layers
B-5	9.0 - 10.5	5.6×10^{-8} Vert.	Gray sandy shale - very sandy & fractured
B-5	9.0 - 10.5	5.9×10^{-6} Horiz.	Gray sandy shale - very sandy & fractured
B-8	20.0 - 21.0	7.3×10^{-7}	Gray sandy shale
B-9	5.0 - 5.75	4.5×10^{-9}	Gray weathered shale w/tan & gray sand seams
B-10	4.0 - 5.0	5.3×10^{-8}	Gray sandy shale
B-12	15.0 - 15.5	2×10^{-7}	Gray shale - jointed & fractured

FIELD INFILTRATION RATES

Boring No.	Interval tests (ft)	"k" cm/sec
B-9	8 1/2 to 24	2×10^{-5}
B-10	5 to 15	2.5×10^{-6}
B-13	5 to 35	6.4×10^{-6}

BAKER-SHIFLETT & ASSOCIATES

Plate 21

1991 BAKER-SHIFLETT
SLUG TEST DATA SUMMARY

JOHNSON COUNTY SANITARY LANDFILL

TIME-LAG PERMEABILITY TESTS
SUMMARY OF TEST RESULTS
February, 1991

Two independent methods have been used to calculate results of the field draw down tests. The two methods are:

1. "Time-Lag and Soil Permeability in Ground-Water Observations," by M. Juul Hvorslev, Bulletin No. 36, Corps of Engineers, U.S. Army, April 1951.

2. "A Microcomputer Program for Interpreting Time-Lag Permeability Tests," by Debora B. Thompson, Ground Water, March 1987, pp. 212-218.

		Hydraulic Conductivity cm/sec	
Location	Test Section	Hvorslev Method	Thompson Program
36A	El. 640.9 - 635.4	3 to 3.5 x 10^{-6}	4 x 10^{-5}
	El. 640.9 - 631.9	2.1 to 2.4 x 10^{-5}	
44A	El. 614.2 - 608.2	1.4 to 1.8 x 10^{-4}	1 x 10^{-4}
	El. 620.2 - 608.2	1 x 10^{-4}	
42	El. 663.0 - 655.5	2 to 3 x 10^{-5}	3 x 10^{-5}
32	El. 689.5 - 679.0	3 to 4.7 x 10^{-4}	6 x 10^{-4}

Note: These test values are characteristic of silty or fine sand, and sandstone as referenced by Freeze and Cherry, Groundwater, 1979.

Plate 11a-E.1

2012 THE CAREL CORPORATION
LABORATORY PERMEABILITY DATA SUMMARY

Table 11e.1
Turkey Creek Landfill
April 2012 Borings

Boring	Ground Surface Elevation**	Total Depth*	Sample Depth*	Sample Elevation**	Hydraulic Conductivity (cm/sec)
B9-1	683.20	45	11	672.20	1.40E-08
B9-2	679.69	45	12	667.69	5.70E-09
B10-1	717.06	90	58.5	658.56	7.80E-08
B10-1	717.06	90	65	652.06	1.90E-09
B10-2	709.92	75	50	659.92	3.00E-08
B11-1	714.74	95	55	659.74	1.10E-08
B11-1	714.74	95	65	649.74	2.20E-09
B12-1	690.88	80	35	655.88	7.90E-09

* - feet below ground surface

** - feet above mean sea level

Maximum Hydraulic Conductivity:	**7.80E-08**
Minimum Hydraulic Conductivity:	**1.90E-09**
Geometric Mean of Hydraulic Conductivity:	**9.53E-09**
Arithmetic Mean:	**1.88E-08**

APRIL 2012 SUBSURFACE CHARACTERIZATION REPORT BY THE CAREL CORPORATION

Attachment 11e

APRIL 2012 SUBSURFACE CHARACTERIZATION OF SECTORS 9, 10 AND 11

TURKEY CREEK LANDFILL

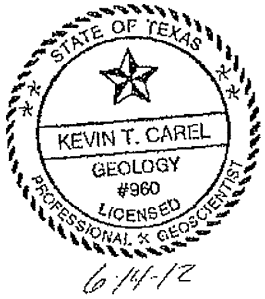
MSW Permit No. 1417B
Johnson County, Texas

Project No: 12-02-38

Prepared for:

IESI TX Landfill, LP

June 2012



6/14/12

Prepared by

The CAREL CORPORATION

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Steven J. Wimmer
Geologist

Kevin T. Carel, P.G
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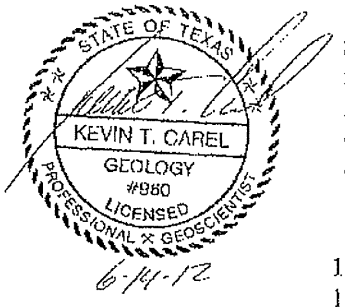
CONTENTS

LIST OF FIGURES AND APPENDICES			iii
1	INTRODUCTION		1
	1.1	Area of Interest	1
2	SITE HYDROGEOLOGY		2
	2.1	Quaternary Alluvium	2
	2.2	Woodbine Formation	2
	2.3	Uppermost Aquifer	2
3	REGULATORY FRAMEWORK		4
4	FIELD ACTIVITIES		6
	4.1	Soil Borings	6
	4.2	Soil Boring and Sampling Methods	6
5	LABORATORY RESULTS		8
	5.1	Soil Samples	8
	5.2	Sieve Analysis	8
	5.3	Atterberg Limits	9
	5.4	USCS Soil Classification	9
	5.5	Vertical Hydraulic Conductivity	9
6	GEOLOGICAL INTERPRETATIONS		11
	6.1	Identification of Uppermost Aquifer	11
	6.2	Geological Analysis	11
7	LOCATION RESTRICTION COMPLIANCE		13
	7.1	Compliance with 30 TAC §335.584(b)(1)	13
	7.2	Compliance with 30 TAC §335.584(b)(2)	13
8	REFERENCES		15

APPENDIX 11e.A – BORING LOGS
APPENDIX 11e.B – STATE OF TEXAS WELL REPORTS
APPENDIX 11e.C – LABORATORY RESULTS



LIST OF TABLES AND FIGURES

TABLES

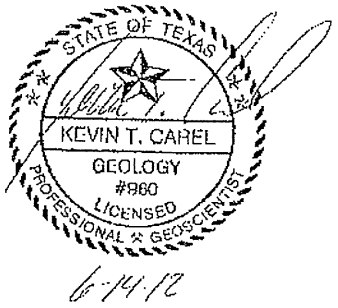
11e.1 – Boring Summary

FIGURES

11e.1 – Soil Boring and Monitor Well Locations
11e.2 – Geologic Cross-Section A-A'
11e.3 – Geologic Cross-Section B-B'
11e.4 – Geologic Cross-Section C-C'
11e.5 – Structure Map - Top of Uppermost Aquifer
11e.6 – Separation Distances
11e.7 – Isopach Map

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

6-14-12



1 INTRODUCTION

IESI TX Landfill, LP (IESI) filed a limited-scope permit amendment application in October 2011 requesting authorization to accept Class 1 non-hazardous industrial waste at the Turkey Creek Landfill. The initial application designated Sectors 9-12 as prospective Class 1 disposal cells. Comments on the application were issued by Texas Commission on Environmental Quality (TCEQ) in a Notice of Deficiency (NOD) letter dated December 28, 2011. One of the comments (#6c) requested that the application be revised to address hydrogeology-related location restrictions (30 TAC §335.584(b)(1) and (2)).

In response to the December 28, 2011 TCEQ letter, a work plan (Carel Corp., 2012) was submitted to the TCEQ in a letter dated March 6, 2012. The work plan recommended that additional borings be advanced within the proposed Class 1 waste disposal Sectors to conduct vertical hydraulic conductivity testing on collected undisturbed samples, and to further characterize the materials between the base of the proposed Class 1 waste cells and the Uppermost Aquifer. The TCEQ approved proceeding with the work plan in a letter dated April 5, 2012.

1.1 Area of Interest

As stated above, the limited-scope permit amendment originally designated Sectors 9-12 as prospective Class 1 disposal cells. Based on an evaluation of the data collected during this subsurface characterization, certain modifications to the landfill design have been made that include re-orientation of the liner grades and layout of the Class 1 disposal cells into three sectors: Sectors 9, 10 and 11; and the elimination of Sector 12. Hence the area of interest addressed in this report includes proposed Sectors 9 - 11.

2 SITE HYDROGEOLOGY

The Turkey Creek Landfill site geology is characterized geologically by Quaternary Alluvium and underlying Cretaceous Woodbine Formation. The site geology and hydrogeology is more thoroughly discussed in Attachment II d (Carel Corp., 2009) of the facility Site Development Plan. A brief summation is provided below.

2.1 Quaternary Alluvium

The Quaternary Alluvium consists of loose sandy clay, sandy silt, and sand deposits, which are associated with weathered bedrock and surficial deposits along Turkey Creek and other adjacent unnamed creeks. Prior to excavation and construction activities, the alluvium thickness ranged from a few feet in the central high area of the site to about 30 feet in the topographically lower areas associated with the slopes along the adjacent creeks. The Alluvium has been removed by excavation within much of the landfill footprint and adjacent borrow areas such that the main remaining extent of the Alluvium is along upper portions of the landfill sidewall. Groundwater occurs in limited perched zones within the Alluvium underlying the Turkey Creek Landfill.

2.2 Woodbine Formation

The Woodbine Formation beneath the site mainly consists of interbedded shale and sandstone lithologies. It is approximately 265 feet thick and dips to the east-southeast at about two (2) degrees. A borehole log of an on-site water well (State Well No. 32-47-101) indicates that the upper 65 feet of the Woodbine is predominantly sandy shale with sandstone from 65 feet below ground surface (bgs) to 75 feet bgs (637 feet to 647 feet MSL). Two deeper sandstone layers in the shale-dominated stratum exist below the depth of 126 feet bgs (below 586 feet MSL).

2.3 Uppermost Aquifer

The Woodbine Aquifer is classified by the Texas Water Development Board (TWDB) as a minor aquifer and is a continuous water-bearing zone underlying the Turkey Creek Landfill. Nomenclature for the Quaternary Alluvium and Woodbine Formation underlying the Turkey Creek Landfill has varied through the years during different site characterization efforts and includes the following:

1991 Nomenclature	1994 Nomenclature	2008 Nomenclature
Upper Groundwater Zone (UGWZ)	"Upper Sand" and "Lower Sand (I)"	Perched Alluvium Groundwater
Lower Water Zone (LWZ)	"Lower Sand (II)"	Woodbine Formation "UPPERMOST AQUIFER"

Note:
Lower Sand (I) – the Lower Sand which outcrops along Turkey Creek
Lower Sand (II) – the Lower Sand which occurs structurally below the Lower Sand which outcrops along Turkey Creek

A permit modification, which included the aforementioned Attachment 11d of the facility Site Development Plan, to update the groundwater monitoring well network to comply with 30 TAC §330.403(a)(2) established that strata previously referred to as the LWZ or Lower Sand (II) within the Woodbine Formation was the Uppermost Aquifer. The permit modification was approved by the TCEQ on April 29, 2009. The permitted groundwater monitoring system includes wells that monitor the Woodbine Formation.

3 REGULATORY FRAMEWORK

Regulations 30 Texas Administrative Code (TAC) Section (§)335.584(b)(1) and (2) are applicable location restrictions for Sectors 9-11, which combine to comprise the approximately 33.5-acre area proposed to be designated as Class 1 waste disposal cells.

Regulation 30 TAC §335.584(b)(1) requires that a new commercial industrial nonhazardous waste landfill facility, or an areal or capacity expansion of an existing commercial industrial nonhazardous waste landfill unit, may not be located in areas where the underlying soil unit(s) within five (5) feet of the base of the containment structure, which includes the sides and bottom of the containment structure, have specified soil classifications (generally gravels or sands) and/or hydraulic conductivity greater than 1×10^{-5} centimeters per second (cm/sec). Exceptions are allowed, such as: if the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for pollutant migration. Based on the geologic setting described in Section 2 of this report, the shallower perched zones of Alluvium at the site include some sandy zones; however, the aforementioned groundwater monitoring well network permit modification demonstrated that these zones were perched and discontinuous and therefore generally not a pathway for significant groundwater, nor pollutant, migration. On this basis, it would be reasonable to conclude that this location restriction is satisfied through the exception allowed by §335.584(b)(1)(B). However, additional measures are also proposed as an enhancement to further ensure compliance with the location restriction in §335.584(b)(1), as addressed herein in Section 7.

30 TAC §335.584(b)(2) states that a new commercial industrial nonhazardous waste landfill facility, or an areal or capacity expansion of an existing commercial industrial nonhazardous waste landfill unit, may not be located in areas overlying a regional aquifer unless the regional aquifer is separated from the base of the containment structure, which includes the sides and bottom of the containment structure, by a minimum of ten (10) feet of material with a hydraulic conductivity towards the aquifer not greater than 10^{-7} cm/sec, or a thicker interval of more permeable material that provides equivalent or greater retardation to pollutant migration. Based on the site geologic setting described in Section 2 of this report, the water bearing sand unit previously referred to as the LWZ or Lower Sand (II), which is considered a component of the Woodbine Formation, has been deemed the Uppermost Aquifer at the site for groundwater monitoring purposes. For this reason,

reason, the location restriction in 30 TAC §335.584(b)(2) as it relates to the Uppermost Aquifer has been the focus of the field activities and data analyses associated with this report.

4 FIELD ACTIVITIES

Field activities associated with the tasks outlined in the work plan took place during April 17-23, 2012. In order to collect undisturbed soil samples at the desired depths, six (6) soil borings were advanced using a CME-75 drill rig operated by a driller licensed in the state of Texas. All drilling occurred under the direct supervision of a professional geoscientist licensed in the state of Texas.

4.1 Soil Borings

Prior to initiation of field activities, boring locations were staked by a surveyor licensed in the state of Texas. Six (6) soil borings (B9-1, B9-2, B10-1, B10-2, B11-1, and B12-1) were installed at locations presented in the work plan (see Figure 11e.1). A summary of boring and soil sample information is provided in Table 11e.1. The soil boring and sampling depths estimated in the work plan were adjusted after receipt of actual surveyed surface elevations. Total depths of the soil borings ranged from 45 feet to 95 feet below ground surface. Each boring was subsequently plugged and abandoned following achievement of total depth and removal of augers.

Lithologic sample logs, prepared in the field, included information regarding the identification and characterization of soil and rock types, the depth at which groundwater was encountered, and other relevant geologic observations. The soil and rock types encountered consisted primarily of shale, silty shale, or silt. Boring logs are provided in Appendix 11e.A, and the State of Texas Well Report for each boring is provided in Appendix 11e.B.

4.2 Soil Boring and Sampling Methods

All borings were advanced using hollow stem auger (HSA) methods to total depth. The lower sections of the borings were continuously sampled and logged using five (5) foot core barrels within the hollow stem augers. In accordance with the approved Work Plan, the upper sections of the borings were not logged. These portions of the borings were drilled with a reverse flight auger placed within the HSA. The location and depths where reverse flight drilling occurred are noted on the boring logs.

Undisturbed soil samples were collected using thin walled Shelby tubes or split spoons at predetermined depths. The upper soil samples were collected at approximately three (3)

feet below the previously approved based of the landfill excavation. It is noted that the landfill excavation grades have been revised as a result of this subsurface characterization project. The locations of the Shelby Tube samples and the split spoon samples are illustrated on the boring logs contained in Appendix 11e.A.

5 LABORATORY RESULTS

Undisturbed soil samples were collected from B9-1, B9-2, B10-1, B10-2, B11-1, and B12-1 for laboratory testing. One (1) sample was collected from each boring per the work plan. Two (2) additional soil samples, one (1) each from B10-1 and B11-1, were collected in response to Item 3 of the April 5, 2012 TCEQ letter. Samples were labeled according to the boring identification and the depth of sample collection (e.g. B9-1-11). Collected samples were shipped to TRI/Environmental, Inc. of Austin, Texas for sieve analysis, Atterberg Limits, Unified Soil Classification System (USCS) classification tests, and vertical hydraulic conductivity. Laboratory results are provided in Appendix 11e.C.

5.1 Soil Samples

Laboratory analyzed Shelby tube soil samples included B9-1-11, B9-2-12, B10-1-65, B10-2-50, B11-1-65, and B12-1-35. A Shelby tube sample was also collected in B10-1 at 53 feet below ground surface. However, the soil sample B10-1-53 fractured in the lab during extraction causing the inability to perform a vertical hydraulic conductivity test. Therefore, a backup sample (B10-1-58.5), collected from the core barrel during drilling, was shipped to the laboratory and analyzed. Additionally, the soils were too hard to advance a Shelby tube in B11-1 at 55 feet below ground surface. Therefore, a sample (B11-1-55) was collected using a split spoon and shipped to the lab for analysis.

Laboratory analyzed soil samples covered a range of 20 vertical feet within the shale above the Uppermost Aquifer. The highest sample was collected at an elevation of 672.20 feet above mean sea level (MSL); whereas, the lowest sample was collected at an elevation of 652.06 feet above MSL. The shale characteristics and descriptions were very consistent between borings (see Appendix 11e.A). The entire section of shale between the landfill liner system and the Uppermost Aquifer is believed to have been thoroughly characterized based on the soil sample range and consistent characteristics.

5.2 Sieve Analysis

Sieve analyses were performed by the laboratory using American Society for Testing and Materials (ASTM) D 422. A sieve analysis is a procedure used to assess the size distribution of solid particles on a series of standard sieves of decreasing size.

Particle sizes from the April 2012 soil samples were uniform and generally less than 0.1 millimeter (mm) as high percentages of materials passed through the final sieve (No. 200 sieve). The sieve analysis results indicated the soil samples collected were predominantly clay.

5.3 Atterberg Limits

The Atterberg limits are a basic measure of the nature of a fine-grained soil and can be used to distinguish between silt and clay. The laboratory determined the Atterberg Limits from the soil samples utilizing ASTM D 4318. Atterberg limits determined for the soil samples included the plastic limit (PL), the liquid limit (LL), and the plasticity index (PI).

The PL of a soil is the water content at which the soil passes from a plastic state to a semi-solid state and is essentially a toughness test. The LL is the water content at which a soil changes from plastic to liquid behavior and is essentially a flow test. The PI is calculated by subtracting the PL from the LL (PI = LL - PL). In general, soils with a high plasticity index (20 to 40) tend to be predominantly clay, those with a medium plasticity index (10-20) tend to be silty clay, those with a lower plasticity index (1-10) tend to be silt, and those with a plasticity index of 0 (non-plastic) tend to have little or no silt or clay.

Seven (7) of the soil samples exhibited high plasticity with a PI range of 26 to 40. One soil sample (B10-2-50) exhibited medium plasticity with a PI of 18. Atterberg limit results indicated the soil samples collected from the April 2012 borings were predominantly clay with some silt.

5.4. USCS Soil Classification

Results of the sieve analysis, combined with the Atterberg limit results provide the information needed to classify the soil according to the USCS. TRI/Environmental, Inc. classified the April 2012 soil samples as either lean or fat clays based on the results of the particle size analysis. Classifications were in accordance with ASTM D 2487.

5.5 Vertical Hydraulic Conductivity

The hydraulic conductivity of a soil describes the ease with which water can move through the pore spaces or fractures within the soil. Soil hydraulic conductivity varies according to the type of soil and other factors. Hydraulic conductivity testing of collected soil samples was performed by the laboratory using ASTM D 5084 Method F. The minimum result was 1.9×10^{-9} cm/sec from sample B10-1-65. The maximum result was 7.8×10^{-8} cm/sec from sample B10-1-58.5. All sample results were less than 1×10^{-7}

cm/sec and the geometric mean for the samples was 9.53×10^{-9} cm/sec. The hydraulic conductivity results demonstrate that the material between the bottom of the liner excavation and the top of the Uppermost Aquifer are of a low permeability.

6 GEOLOGICAL INTERPRETATIONS

6.1 Identification of Uppermost Aquifer

The top of the Uppermost Aquifer has been indentified in the April 2012 soil boring based on sediment type and moisture. The upper portion of the shale interval was observed to be hard and dry. For purposes of compliance with 30 TAC §335.584(b)(2), the top of the Uppermost Aquifer has been determined to the uppermost moist or wet sand or silt layers interbedded within the shale interval. This interpretation is considered conservatively-high in elevation, as some sand or silt zones are not believed to be interconnected and may yield only minimal quantities of water. Descriptions of sediment type and the degree of saturation (i.e. moist, wet, etc.) observed in the field are noted on the boring logs provided in Appendix 11c.A.

6.2 Geological Analysis

To evaluate the geologic conditions in the vicinity of proposed Class 1 waste disposal cells, information from the April 2012 soil borings and from other proximal existing soil borings and monitor wells was used to construct three (3) geologic cross-sections and a structure map of the top of the Uppermost Aquifer (see Figures 11c.2 through 11c.5).

The cross-sections illustrate the location of the Uppermost Aquifer relative to the bottom of proposed Class 1 waste disposal cells, and also indicate that the base of the containment structures is underlain by shale strata. Where appropriate, the soil sample locations are illustrated on the cross-sections with the resulting hydraulic conductivity noted.

A Structure Map of the top of the Uppermost Aquifer was provided in the March 2012 work plan. The Structure Map was revised to incorporate the supplemental geologic data derived from the April 2012 soil borings. The supplemental data collected in April2012 was consistent with the expected structure predicted by the previous version of the Uppermost Aquifer structure map, which provides an added level of confidence in the findings. The updated map is provided as Figure 11c.5 of this report. The structure map indicates that the top of the Uppermost Aquifer is an undulating surface that dips to the north and east. It should be noted that the map incorporates more than one geologic stratum and is not reflective of a single geologic sand or silt layer - as mentioned, this

approach results in a top of Uppermost Aquifer surface that is believed to be conservatively-high (i.e., worst case interpretation for this location restrictions evaluation).

After the top of Uppermost Aquifer surface was finalized, Geosyntec Consultants performed a three-dimensional (3-D) digital terrain modeling (DTM) comparison to evaluate the separation distance between the previously-permitted bottom of liner system and the aquifer. This evaluation revealed portions of the previously permitted liner system with an apparent separation distance of less than 10-ft between the bottom of the liner system and the top of the aquifer. While it may have been possible to demonstrate compliance of the previous liner grades with 30 TAC §335.584(b)(2) through, for example, hydraulic flux calculations or provision of engineered controls; instead, the liner system grading and sector layout has been revised through this procedure to provide a 10-ft minimum separation between the bottom of the liner system and the top of the aquifer in all locations proposed for Class 1 waste disposal.

These revised liner system grades are presented on Site Development Plan Attachment 1B. A bottom of liner (i.e., bottom of excavation) grading plan has also been prepared by Geosyntec Consultants by lowering the liner system grades by 3-ft to account for the thickness of the compacted clay liner in the Class 1 waste disposal sectors, and is presented on Figure 11e.6 herein. Figure 11e.6 also presents the superimposed top of aquifer structural map, and further, presents the results of the 3-D DTM modeling calculation of the separation distance. Inspection of Figure 11e.6 reveals shaded areas that correspond to different separation distance intervals between the bottom of the liner system and the top of the aquifer. Figure 11e.7 is also presented herein, and provides an isopach map that presents the same separation distance information as is presented on Figure 11e.6, except that instead of using shading, Figure 11e.7 uses isopach contours to represent the separation distance.

Figures 11e.6 and 11e.7 show that the typical separation distance between the bottom of the liner system and the top of the aquifer often ranges from about 14 feet to over 30 feet in most cell floor areas. Both Figures demonstrate that a 10-ft minimum separation between the bottom of the liner system and the top of the aquifer is provided in all locations proposed for Class 1 waste disposal, irrespective of the low vertical hydraulic conductivities of the underlying materials at this site, as previously discussed above.

7 LOCATION RESTRICTION COMPLIANCE

7.1 Compliance with 30 TAC §335.584(b)(1)

Regulation 30 TAC §335.584(b)(1) requires that a new commercial industrial nonhazardous waste landfill facility, or an areal or capacity expansion of an existing commercial industrial nonhazardous waste landfill unit, may not be located in areas where the underlying soil unit(s) within five feet of the base of the containment structure, which includes the sides and bottom of the containment structure, have specified soil classifications (generally gravels or sands) and/or hydraulic conductivity greater than 1 x 10^{-5} centimeters per second (cm/sec). Exceptions are allowed, such as if the soil unit is not sufficiently thick and laterally continuous to provide a significant pathway for pollutant migration. Based on the geologic setting described in Section 2 of this report, the shallower perched zones of Quaternary Alluvium at the site include some of the restricted soil types (e.g. sandy zones). These sand zones were demonstrated to be discontinuous, contain perched groundwater and located vertically above the base of the landfill. Therefore the shallow sand zones are not a pathway for significant groundwater, nor pollutant, migration. Regardless, as an added measure of protection, where shallow sandy zones are encountered along the sidewalls within Sectors 9 through 11, the facility will over-excavate the sand and construct a five (5) feet thick recompacted "clay plug" separation barrier beneath the compacted clay component of the liner system to provide a 5-ft minimum separation under 30 TAC §335.584(b)(1). The extent of the clay plug and a typical cross section are provided on Site Development Plan Attachments 10C1 and 10C2, respectively.

7.2 Compliance with 30 TAC §335.584(b)(2)

As discussed in Section 5.5 of this report, all vertical hydraulic conductivity results from the April 2012 soil samples were less than 1 x 10^{-7} cm/sec and the geometric mean for the samples was 9.53 x 10^{-9} cm/sec. Therefore, the materials between the base of the proposed Class 1 waste cells and the Uppermost Aquifer are in compliance with the vertical permeability requirements of 30 TAC §335.584(b)(2). The landfill design has been modified to provide a minimum separation between the base of the landfill and the Uppermost Aquifer of ten (10) feet in all proposed Class 1 waste disposal areas, to meet the separation distance requirements of 30 TAC §335.584(b)(2). Furthermore, it is important to note that the measured hydraulic conductivity of the material between the

base of the landfill and the top of the aquifer had a hydraulic conductivity that is over ten (10) times lower than specified in the location restriction, which is very favorable. In terms of hydraulic flux equivalency, ten (10) feet of material with a hydraulic conductivity of 9.53×10^{-9} cm/sec is the equivalent of over 105 feet of material with a hydraulic conductivity of 1.0×10^{-7} cm/sec.

The proposed design meets the location restriction requirements of 30 TAC §335.584(b)(2).

8 REFERENCES

Texas Administrative Code (TAC). Title 30 Part 1 Chapter 335 Subchapter T: Permitting Standards for Owners and Operators of Commercial Industrial Nonhazardous Waste Landfill Facilities.

Texas Commission on Environmental Quality (TCEQ). Letter to Mr. Joseph A. Vieceli, Region Environmental Manager, IESI TX Landfill. Dec. 28, 2011. Limited Scope Major Permit Amendment – Addition of Class 1 Nonhazardous Industrial Waste – Notice of Deficiency (NOD).

Texas Commission on Environmental Quality (TCEQ). Letter to Mr. Joseph A. Vieceli, Region Environmental Manager, IESI TX Landfill. April 5, 2012. Limited Scope Major Permit Amendment – Work Plan for Supplemental Investigation of Permeability.

The Carel Corporation (Carel Corp), 1994. Site Development Plan Attachment 11d, *Summary Report for Monitor Wells, Technical Demonstration of the Groundwater Monitoring System*, Turkey Creek Landfill, MSW Permit Number 1417-B.

The Carel Corporation (Carel Corp), 2012. Work Plan for Supplemental Investigation of Soil Permeability, Turkey Creek Landfill, Permit No. MSW-1417B, Johnson County, Texas.

TABLES

Table 11e.1
Turkey Creek Landfill
April 2012 Borings

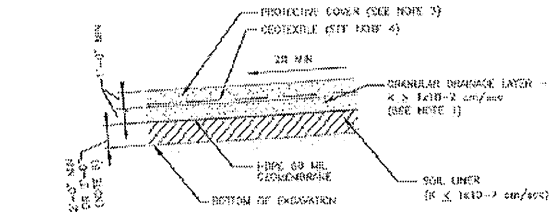
Boring	Ground Surface Elevation	Total Depth*	Sample Depth*	Sample Elevation**	Hydraulic Conductivity (cm/sec)
B9-1	683.20	45	11	672.20	1.40E-08
B9-2	679.69	45	12	667.69	5.70E-09
B10-1	717.06	90	58.5	658.56	7.80E-08
B10-1	717.06	90	65	652.06	1.90E-09
B10-2	709.92	75	50	659.92	3.00E-08
B11-1	714.74	95	55	659.74	1.10E-08
B11-1	714.74	95	65	649.74	2.20E-09
B12-1	690.88	80	35	655.88	7.90E-09

* - feet below ground surface

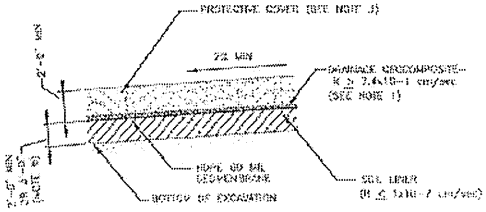
** - feet above mean sea level

Maximum Hydraulic Conductivity:	7.80E-08
Minimum Hydraulic Conductivity:	1.90E-09
Geometric Mean of Hydraulic Conductivity:	9.53E-09

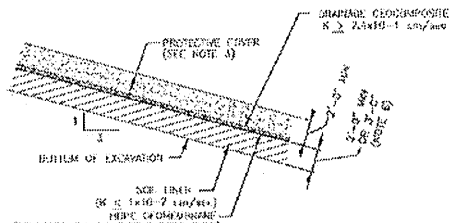
FIGURES



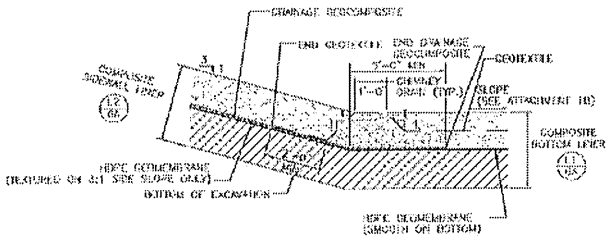
COMPOSITE BOTTOM LINER (OPTION 1) (L1 / 1E,1F,1G) ⚠

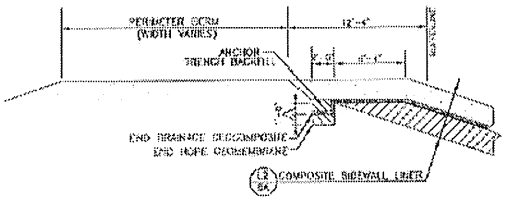


COMPOSITE BOTTOM LINER (OPTION 2) (L1 / 1E,1F,1G) ⚠



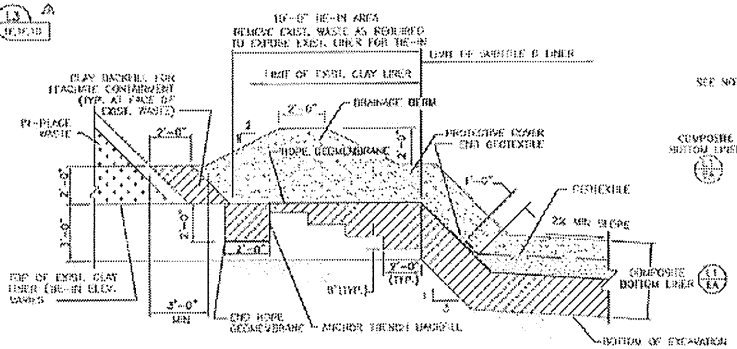
COMPOSITE SIDEWALL LINER (L2 / 1E,1F,1G,6A) ⚠

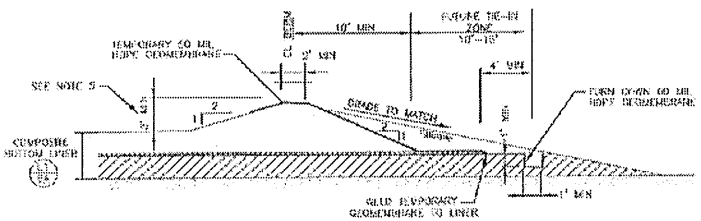




ANCHOR TRENCH DETAIL (L1 / 1B,6C)

LINER DETAIL AT SLOPE TRANSITION (L1 / 1E,1F,1G) ⚠





LINER TERMINATION BERM (L6 / 1G) ⚠

EXISTING CLAY LINER TIE-IN (L5 / 1G) ⚠

NOTES:

1. A DRAINAGE GEOCOMPOSITE WITH 2'-0" OF PROTECTIVE COVER ABOVE MAY BE USED ON THE BOTTOM LINER IN LIEU OF THE GRANULAR DRAINAGE LAYER. IF A GRANULAR DRAINAGE LAYER IS USED, IT WILL HAVE A HYDRAULIC CONDUCTIVITY, K ≥ 1x10-2 CM/SEC.
2. REFER TO ATTACHMENT 1B AND 1I FOR BACKFILL SPECIFICATIONS.
3. PROTECTIVE COVER WILL CONSIST OF ONSITE SOILS OR IRIC CHIPS AND CHIMNEY DRAINS WILL BE UTILIZED TO FACILITATE FLOW INTO THE LEACHATE COLLECTION SYSTEMS AS SPECIFIED ON THE ATTACHMENT C DRAWINGS. CHIMNEY DRAINS WILL NOT BE NEEDED IF K ≥ 1x10-2 CM/SEC FOR THE PROTECTIVE COVER MATERIAL.
4. GEOTEXTILE USED AS A FILTER OR OVERLAP WILL BE DESIGNED ONCE THE FINAL SOIL MATERIAL TYPES HAVE BEEN SELECTED. FOR FILTER GEOTEXTILES, K ≥ 2.0x10-3 CM/SEC.
5. IF THE LINER TERMINATION BERM IS ALSO UTILIZED AS A CONTAMINATED WATER CONTAINMENT BERM, THE HEIGHT OF THE BERM WILL BE INCREASED TO 12 FEET TO CONTAIN WITH THE MINIMUM HEIGHT REQUIRED FOR THE CONTAINMENT BERM (SEE ATTACHMENT 1B-APPENDIX 1D FOR SUPPORTING CALCULATIONS).

⚠ 6. ALL CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE DISPOSAL SECTIONS SHALL BE CONSTRUCTED WITH A 4-FT THICK COMPACTED CLAY LINER.

⚠	6-13	REVISE TIE-IN AREA REMOVE CRUST, WASTE AS REQUIRED TO EXPOSE EXIST. CLAY LINER FOR TIE-IN	JAY	WLB	JMC	JMC
2	2-13	NEW CHIMNEY	DMP	PJC	DP	DES
1	6-12	NOTE AND BASE CHANGE	DMP	PJC	DP	DES
NO.	DATE	REVISIONS	BY	CHK	APP	DES
DATE OF ISSUE: 06-12		DWG #: CLAY			SHT #: 6A	
DES: TEAM		DFT BY: JMC			APP: DP	

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LINER DETAILS I

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

ATTACHMENT NO. 6A

6/14/2012

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SCOTT M. GRAVES
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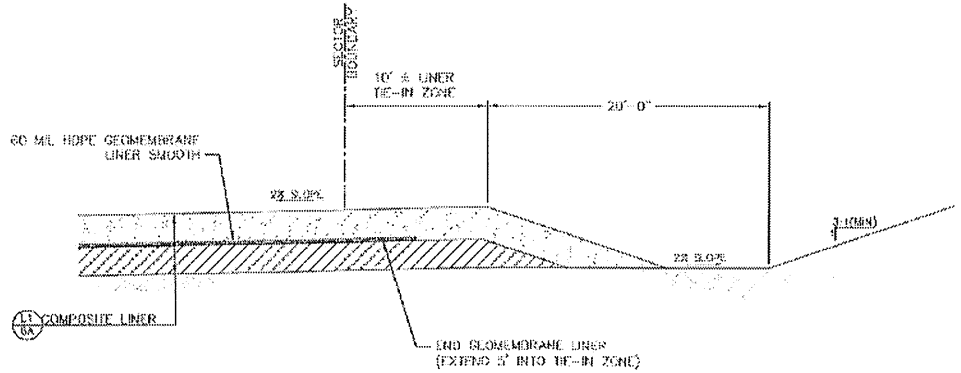
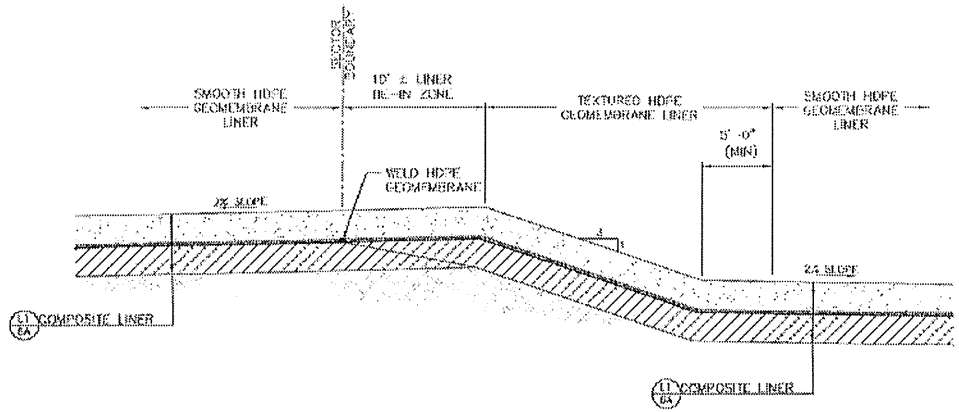


LINER TERMINATION AT SECTOR BOUNDARY FOR FUTURE LINER TIE-IN (6A.1-1 / 1B)



COMPOSITE LINER TIE-IN AT SECTOR BOUNDARY (6A.1-2 / 1B)

NOTES:

1. IF THE GEOCOMPOSITE LEG OPTION IS SELECTED, THE DOUBLE-SIDED DRAINAGE GEOCOMPOSITE SPECIFIED ON THE 3:1(V) SIDESLOPES SHALL OVERLAP THE SINGLE-SIDED DRAINAGE GEOCOMPOSITE A MINIMUM OF 3 FEET AT SLOPE TRANSITIONS.
2. ALL CLASS 1 NON-HAZARDOUS INDUSTRIAL WASTE DISPOSAL SECTORS SHALL BE CONSTRUCTED WITH A 3-FT THICK COMPACTED CLAY LINER.

6/14/2012

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1	6-12	DETAIL REVISIONS	LA	SMC	SMC	SMC

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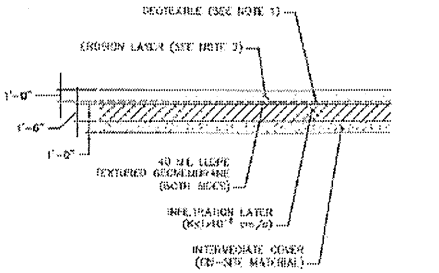
LINER SYSTEM DETAILS II

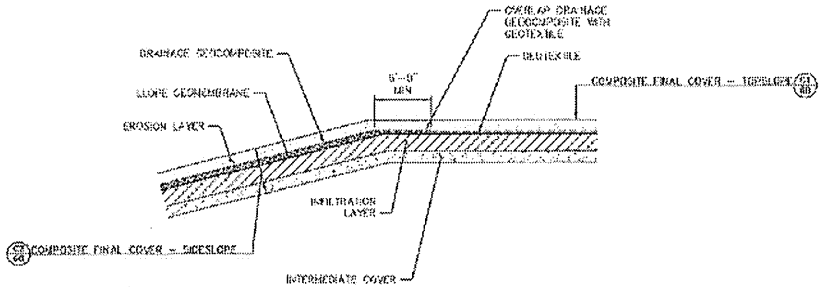
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

ATTACHMENT NO. 6A.1



COMPOSITE FINAL COVER – TOPSLOPE G1 (E,I) ,(E,G)



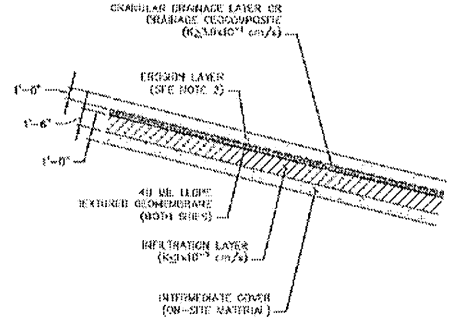


FINAL COVER AT SLOPE TRANSITION G3 (E,I,C,I)

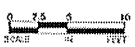


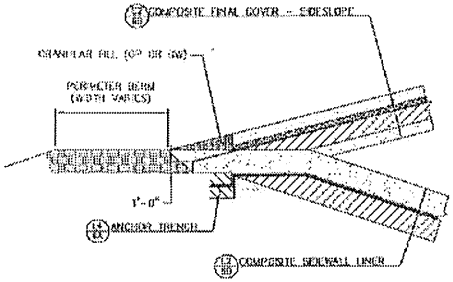
NOTES:

1. GEOTEXTILE USED AS A FILTER OR EROSION MAT SHALL BE DESIGNED ONCE THE FINAL SOIL MATERIAL TYPES HAVE BEEN SELECTED FOR FILTER GEOTEXTILES, $K \geq 2.5 \times 10^{-1}$ cm/sec.
2. SOIL USED FOR THE EROSION LAYER WILL BE CAPABLE OF SUSTAINING NATIVE VEGETATION.
3. THE DETAILS PRESENTED ON THIS SHEET ARE FOR NEW SECTIONS (E) THOSE SECTIONS THAT HAVE NOT BEGUN OF CLASS 1 WASTE. REFER TO ATTACHMENT 6D1.1 FOR FINAL COVER DETAILS OF SECTIONS THAT HAVE DISPOSED OF CLASS 1 WASTE.



COMPOSITE FINAL COVER – SIDESLOPE G2 (E,I),(E,G)





LINER / COVER TIE–IN C4 (E,I,C,I)



4/11/2012

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2	6-12	FINAL TOPSLOPE	JP	MW	LMC	LMC
1	2-12	BASE GRADES	PMP	KKC	JP	GLB
0	6-11	ORIGINAL ISSUANCE	GLB	AAG	GLB	GLB
REV	DATE	DESCRIPTION	DRN	DES	CHK	APP

DATE OF ISSUE: CAD ID: ... DRN: ... CHK: ... APP: ...
SCALE: AS NOTED | FILE ID: ... DES: ... APP: ...

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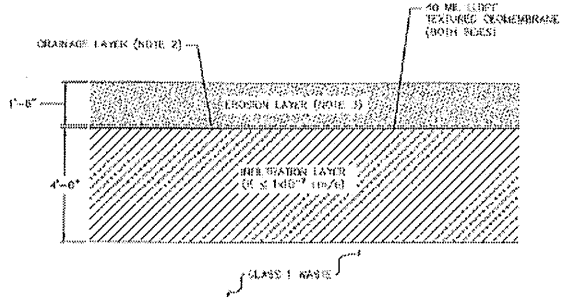
TYPICAL FINAL COVER DETAILS
- MSW SECTORS

BURKLY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

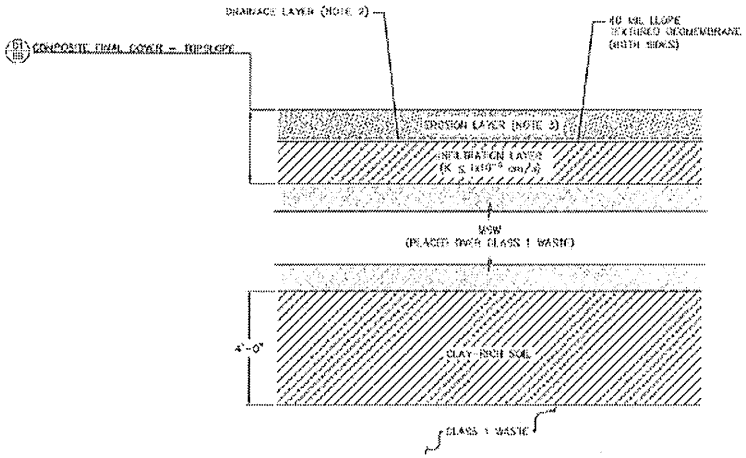
ATTACHMENT 6D
6B



COMPOSITE FINAL COVER – CLASS 1 WASTE SECTORS (E8 / 1H)

SCENARIO 1: IF CLASS 1 WASTE PLACED TO FINAL WASTE GRADES

SCALE IN FEET



COMPOSITE FINAL COVER – CLASS 1 WASTE SECTORS (E8 / 1H)

SCENARIO 2: IF MSW PLACED ABOVE CLASS 1 WASTE

SCALE IN FEET

NOTES:

1. FOR SCENARIO 1, DETAILS FOR CLASS 1 WASTE FINAL COVER SIDESLOPE, TOPSLOPE SIDESLOPE TRANSITION, AND LINER/COVER TIE-IN SHALL BE CONSISTENT WITH THOSE DETAILS ON ATTACHMENT E8, EXCEPT THAT THE SOIL COMPONENT TYPES/THICKNESSES SHOWN ON THIS SHEET SHALL APPLY. FOR SCENARIO 2, THE SIDESLOPE, TOPSLOPE-SIDESLOPE TRANSITION, AND LINER/COVER TIE-IN SHOWN ON ATTACHMENT E8 SHALL APPLY.
2. DRAINAGE LAYER FOR TOPSLOPES AND SIDESLOPES SHALL BE THE SAME AS SPECIFIED FOR FINAL COVER OVER MSW SHOWN ON ATTACHMENT E8.
3. SOIL USED FOR THE EROSION LAYER WILL BE CAPABLE OF SUSTAINING THE SELECTED VEGETATION.

6/4/2012

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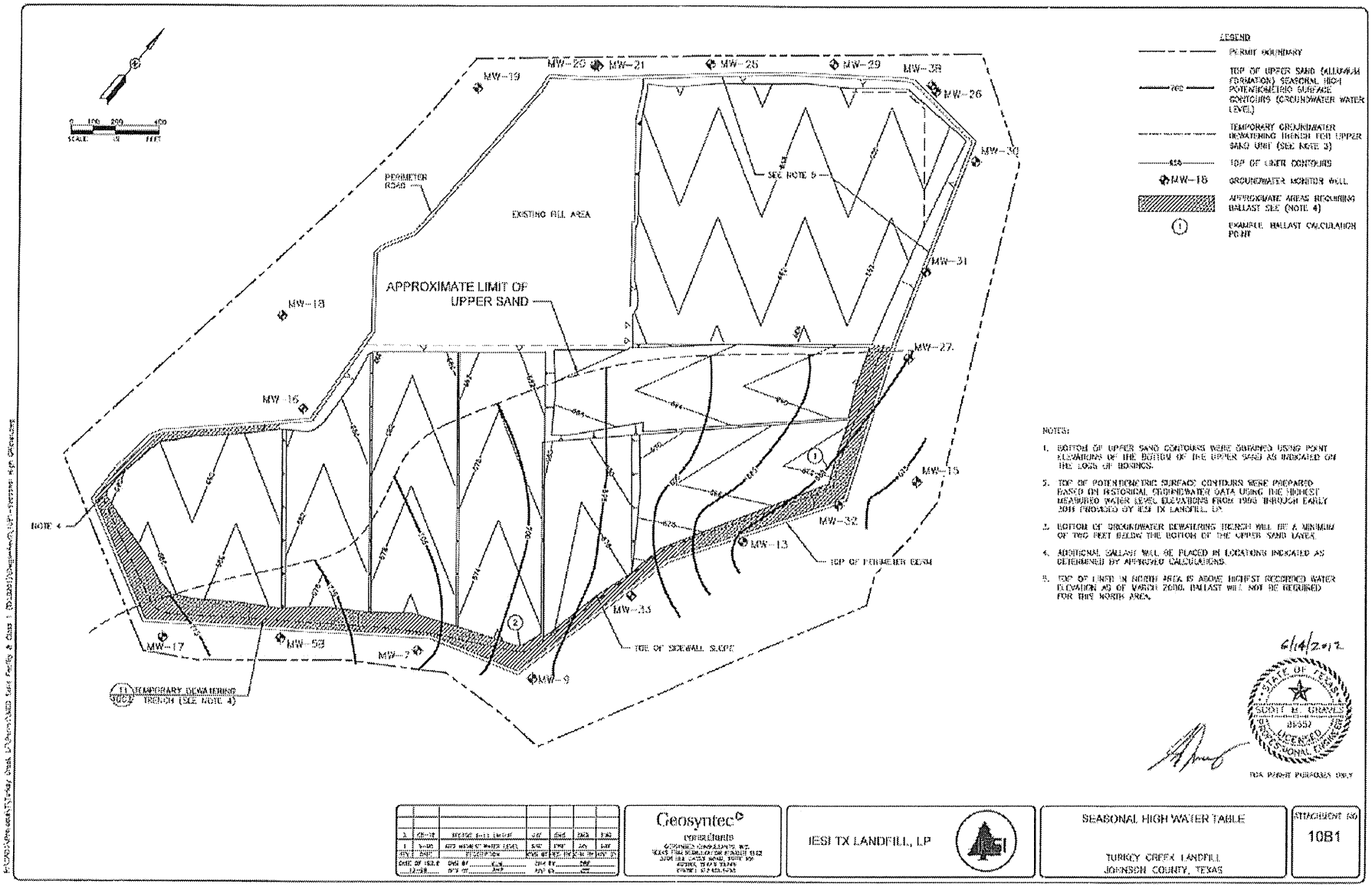
TYPICAL COVER DETAILS - CLASS 1 WASTE SECTORS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

ATTACHMENT NO. 6B.1


LEGEND
PERMIT BOUNDARY
TOP OF UPPER SAND (ALLUVIUM FORMATION) SEASONAL HIGH POTENTIOMETRIC SURFACE CONTOURS (GROUNDWATER WATER LEVEL)
TEMPORARY GROUNDWATER DEWATERING TRENCH FOR UPPER SAND UNIT (SEE NOTE 3)
TOP OF LINER CONTOURS
GROUNDWATER MONITOR WELL
APPROXIMATE AREAS REQUIRING BALLAST SEE (NOTE 4)
EXAMPLE BALLAST CALCULATION POINT
MW-19
MW-20
MW-21
MW-25
MW-29
MW-38
MW-26
MW-30
MW-31
MW-27
MW-15
MW-32
MW-13
MW-33
MW-18
MW-16
MW-17
MW-28
MW-7
MW-9
PERIMETER ROAD
EXISTING FILL AREA
APPROXIMATE LIMIT OF UPPER SAND
SEE NOTE 5
TOP OF PERIMETER BERM
TOE OF SIDEWALL SLOPE
NOTE 4
TEMPORARY DEWATERING TRENCH (SEE NOTE 4)
0 100 200 400
SCALE: 1" = 200' FEET
NOTES:
1. BOTTOM OF UPPER SAND CONTOURS WERE GENERATED USING POINT ELEVATIONS OF THE BOTTOM OF THE UPPER SAND AS INDICATED ON THE LOGS OF BORINGS.
2. TOP OF POTENTIOMETRIC SURFACE CONTOURS WERE PREPARED BASED ON HISTORICAL GROUNDWATER DATA USING THE HIGHEST MEASURED WATER LEVEL ELEVATIONS FROM 1998 THROUGH EARLY 2011 PROVIDED BY IESI TX LANDFILL, LP.
3. BOTTOM OF GROUNDWATER DEWATERING TRENCH WILL BE A MINIMUM OF TWO FEET BELOW THE BOTTOM OF THE UPPER SAND LINER.
4. ADDITIONAL BALLAST WILL BE PLACED IN LOCATIONS INDICATED AS DETERMINED BY APPROVED CALCULATIONS.
5. TOP OF LINER IN NORTH AREA IS ABOVE HIGHEST RECORDED WATER ELEVATION AS OF MARCH 2008. BALLAST WILL NOT BE REQUIRED FOR THIS NORTH AREA.
6/14/2012
STATE OF TEXAS
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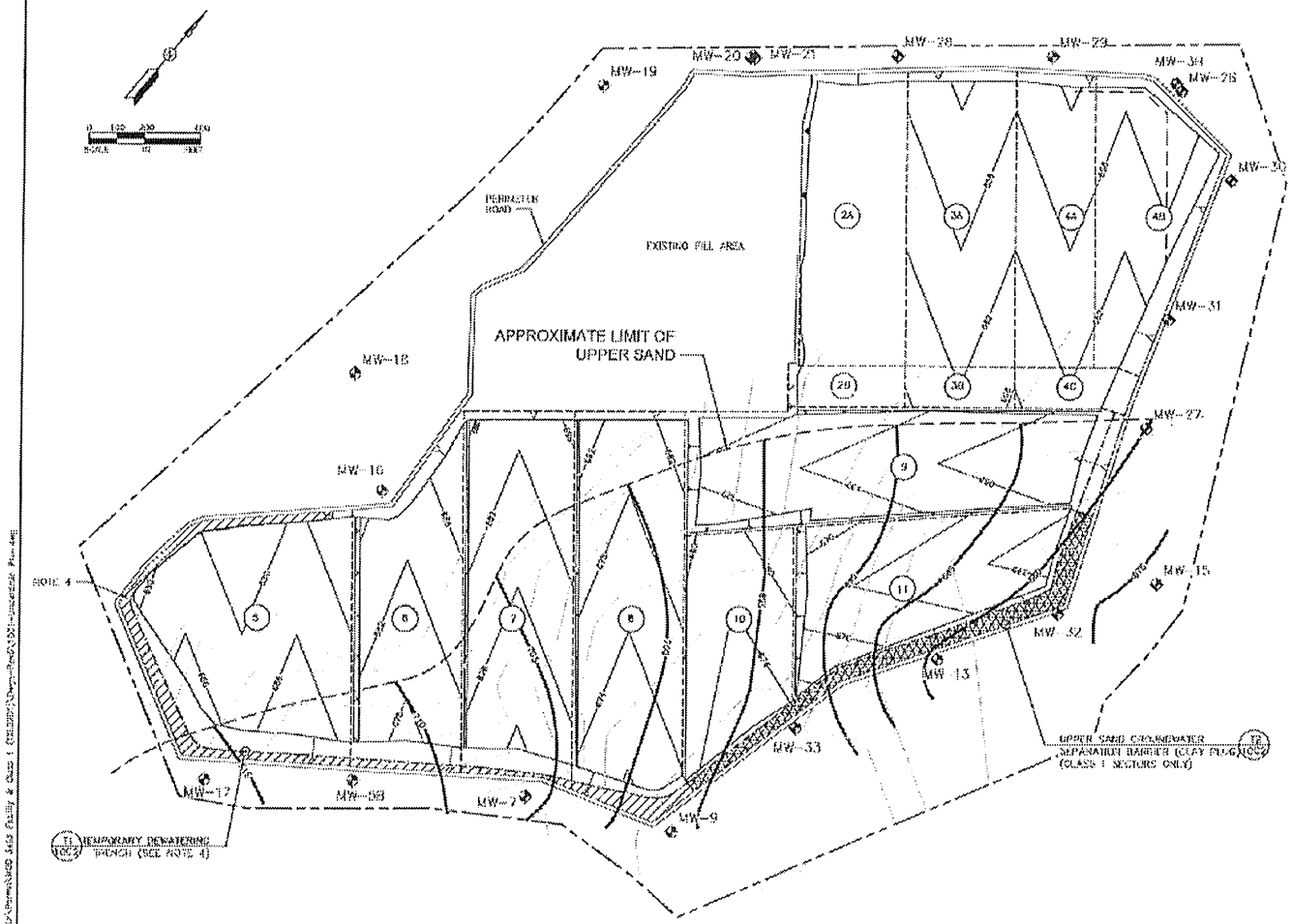
Geosyntec consultants
IESI TX LANDFILL, LP
SEASONAL HIGH WATER TABLE
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
ATTACHMENT III-G
10B1



LEGEND

- PERMIT BOUNDARY
- BOTTOM OF UPPER SAND CONTOURS (FEET M.S.L.)
- 755 — TOP OF UPPER SAND (ALLUVIUM FORMATION) SEASONAL HIGH POTENTIOMETRIC SURFACE CONTOURS (GROUNDWATER WATER LEVEL)
- TEMPORARY GROUNDWATER DEWATERING TRENCH FOR UPPER SAND UNIT (SEE NOTE 3)
- 836 — TOP OF LINER CONTOURS
- MW-18 GROUNDWATER MONITOR WELL
- APPROXIMATE AREA WHERE UPPER SAND WILL BE EXPOSED DURING LINER CONSTRUCTION
- APPROXIMATE AREA WHERE UPPER SAND GROUNDWATER SEPARATION BARRIER (CLAY PLUG) REQUIRED
- 4A SECTOR DESIGNATION

NOTES:

1. BOTTOM OF UPPER SAND CONTOURS WERE OBTAINED USING POINT ELEVATIONS OF THE BOTTOM OF THE UPPER SAND AS INDICATED ON THE LOGS OF BORINGS.
2. TOP OF POTENTIOMETRIC SURFACE CONTOURS FOR THE UPPER SAND WERE PREPARED BASED ON HISTORICAL GROUNDWATER DATA USING THE HIGHEST MEASURED WATER LEVEL ELEVATIONS FROM 1995 THROUGH EARLY 2011 PROVIDED BY IESI TX LANDFILL, LP.
3. BOTTOM OF GROUNDWATER DEWATERING TRENCH WILL BE A MINIMUM OF TWO FEET BELOW THE BOTTOM OF THE UPPER SAND LAYER.
4. TEMPORARY UNDERDRAIN SUMPS WILL BE CONSTRUCTED AS NECESSARY TO PROVIDE POSITIVE DRAINAGE FOR UNDERDRAIN SYSTEM. DESIGN OF TEMPORARY SUMPS WILL BE DOCUMENTED IN SER FOR EACH CELL.

6/14/2012

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

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1	06-12	REVISED PER TCEQ COMMENTS	JW	DAB	EAS	SSG
NO.	DATE	DESCRIPTION	DRAWN BY	DESIGN BY	CHECK BY	APPR BY

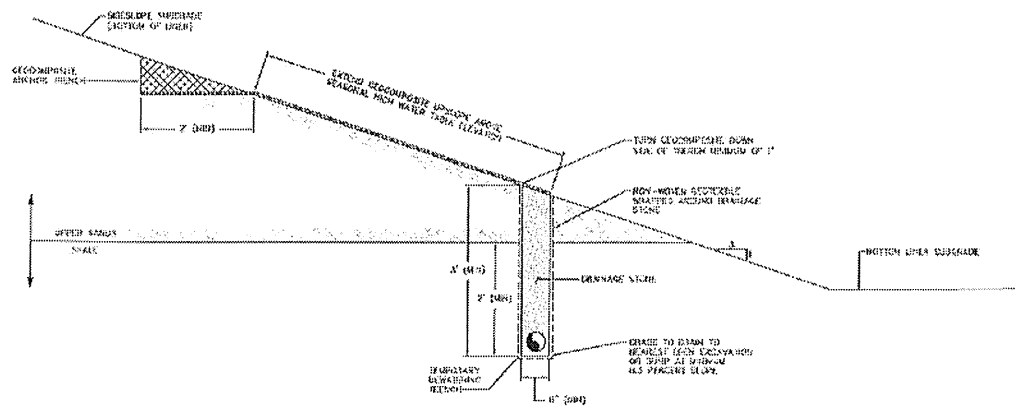
DATE OF ISSUE: JUNE 2012 DWN BY: JW DES BY: DAB CHK BY: EAS APP BY: SSG

Geosyntec consultants

IESI TX LANDFILL, LP

SOUTH AREA UNDERDRAIN PLAN AND UPPER SAND SEPARATION BARRIER (CLAY PLUG) LOCATION
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

ATTACHMENT NO. 10C1

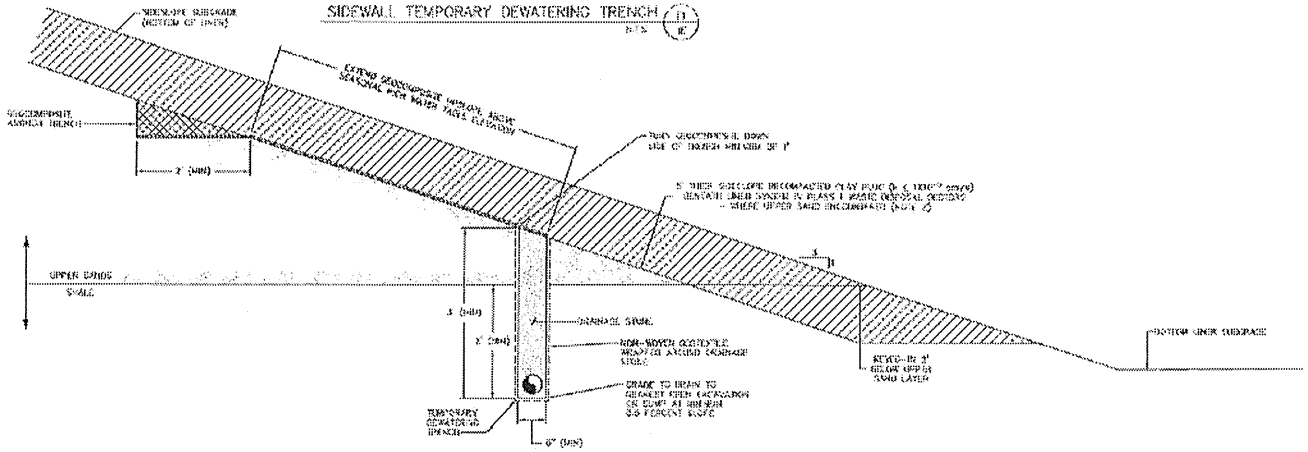


SIDEWALL TEMPORARY DEWATERING TRENCH (D) (E)

NTS

NOTES:

1. DETAIL TO BE USED ALONG PORTIONS OF D TO BE DESIGNED DESIGNATED FOR CLASS 1 WASTE DISPOSAL.
2. THE PURPOSE OF THE CLAY PLUG IN CLASS 1 SECTORS IS TO PROTECT THE SEPARATION BARRIER FROM THE UPPER SAND FORMATION BOULDERS UNDER 20 MASSIVE(MHO)(H).
3. RECOMPACTED CLAY PLUG SHALL HAVE A $k \leq 1 \times 10^{-6}$ cm/s AND SHALL BE CONSTRUCTED IN A CONSISTENT MANNER WITH SOIL LINER AS SET FORTH IN THE SUBMX.



UPPER SAND SEPARATION BARRIER (CLAY PLUG) (D) (E)
(CLASS 1 SECTORS ONLY)

NTS

4/4/2012

STATE OF TEXAS
SCOTT M. GRAVES
68587
LICENSED PROFESSIONAL ENGINEER

FOR PERMIT PURPOSES ONLY

NO.	DATE	REVISIONS	CK	SAC	LMG	BMB

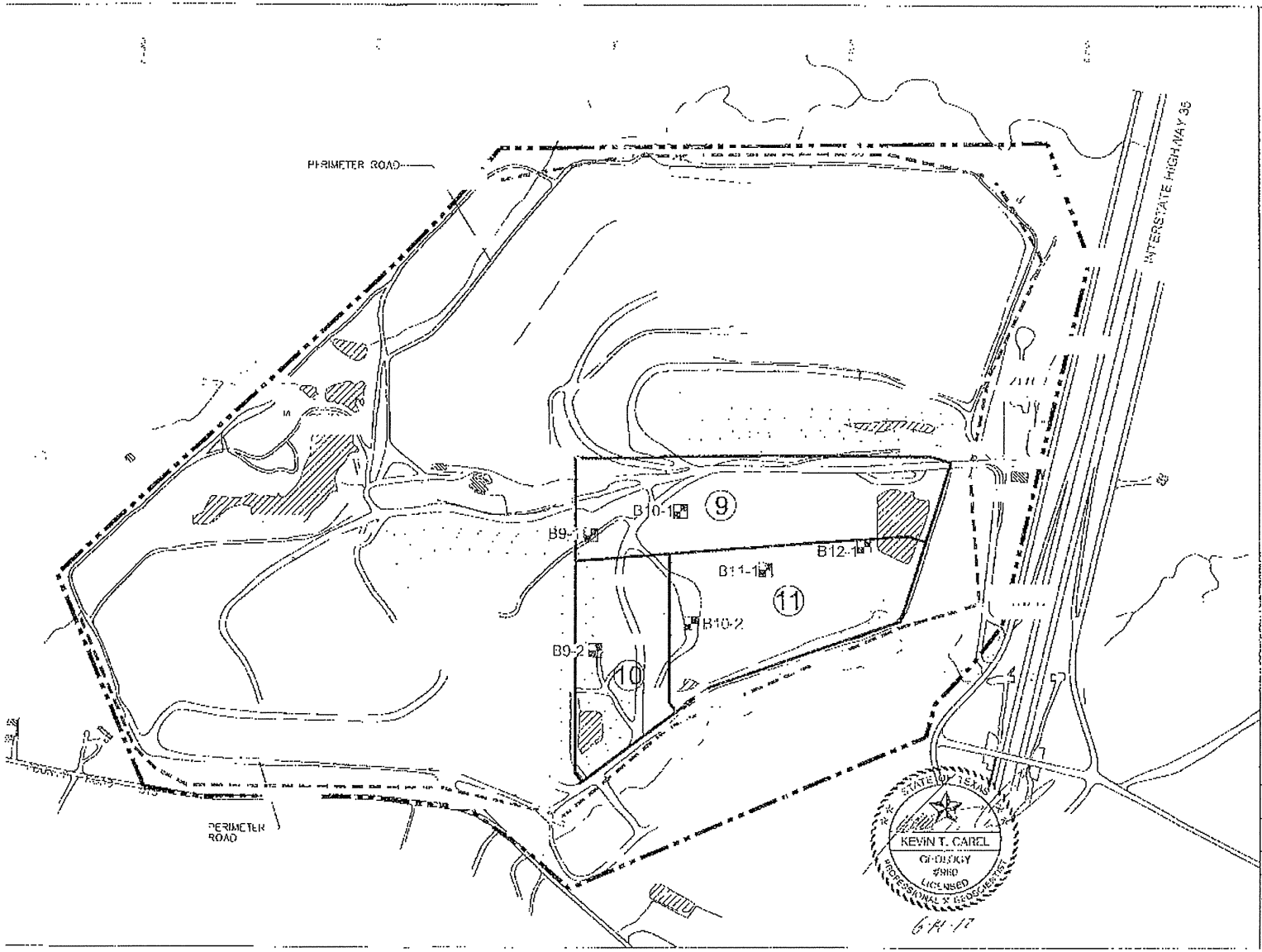
DES. BY ..... DRN BY ..... CHK BY ..... APP BY .....

Geosyntec consultants
GEOSYNTEC CONSULTANTS, INC.
TEXAS FIRM REGISTRATION NUMBER 1443
3636 EXECUTIVE DRIVE, SUITE 300
AUSTIN, TEXAS 78731
PHONE: 512.451.6361

IESI TX LANDFILL, LP

TEMPORARY DEWATERING TRENCH DETAILS AND UPPER SAND SEPARATION BARRIER (CLAY PLUG)
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

ATTACHMENT NO. 10C2



111G-D-46

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- PERMIT BOUNDARY
- PERMIT GUIDANCE
- PREVIOUSLY DRILLED SOIL BORINGS
- EXISTING MONITOR WELL (TO BE ABANDONED)
- EXISTING GROUNDWATER MONITOR WELL
- APRIL 2012 SOIL GAS PROBE LOCATION
- 500 EXISTING GROUND CONTOUR
- APPROXIMATE LIMITS OF WASTE
- (11) SECTOR DESIGNATION

SCALE:

0 150 300 600

FEET

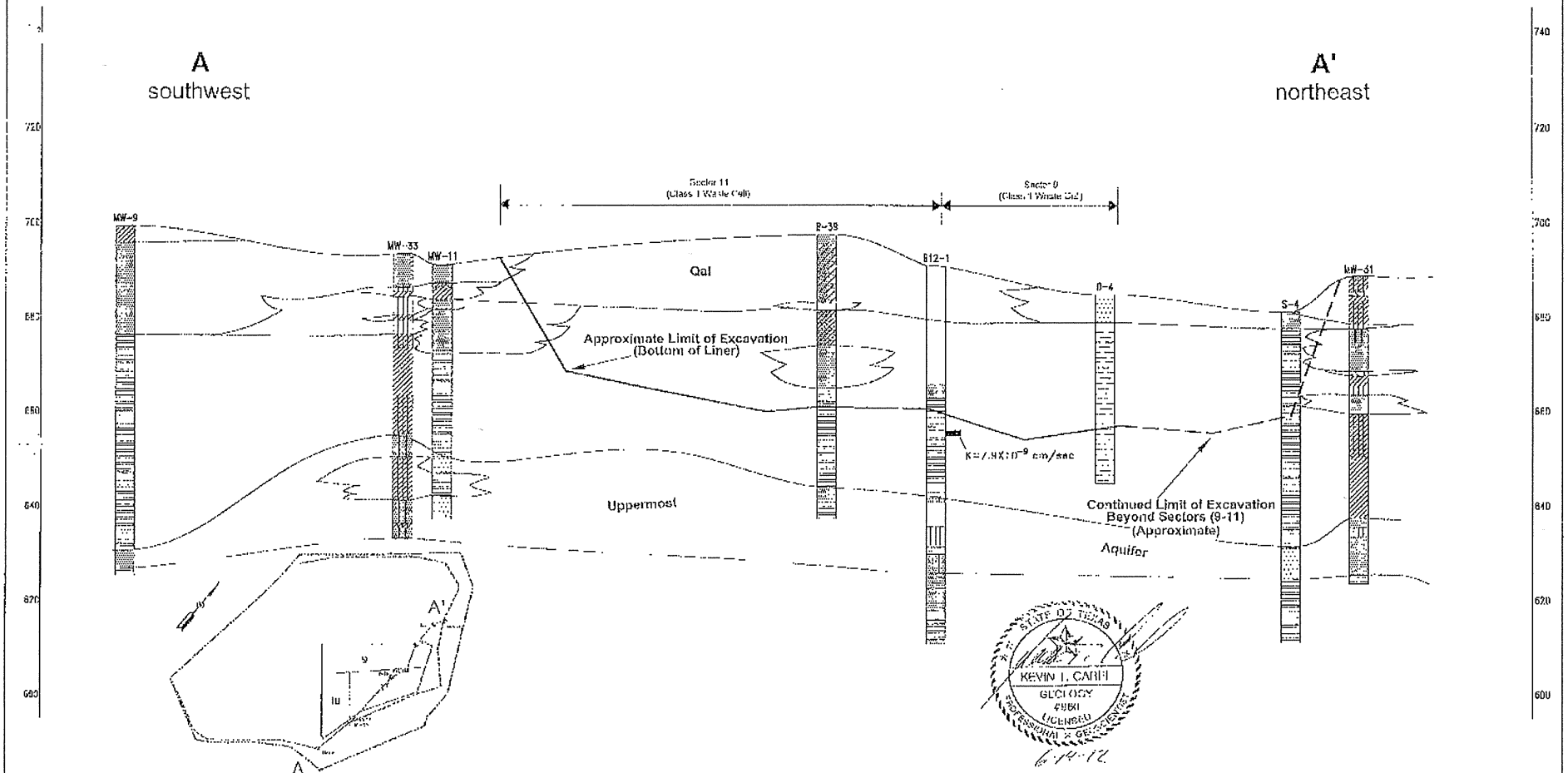
SOIL BORING LOCATIONS

APRIL 2012 BORINGS

TURKEY CREEK LANDFILL

JOHNSON COUNTY, TEXAS

DATE DRAFTED: MAY 2012	REV. NO. 0
FILENAME:	
DESIGNED BY: KTC	FIGURE:
DRAWN BY: SNG	11e.1
CHECKED BY: KTC	
APPROVED BY: KTC	



The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

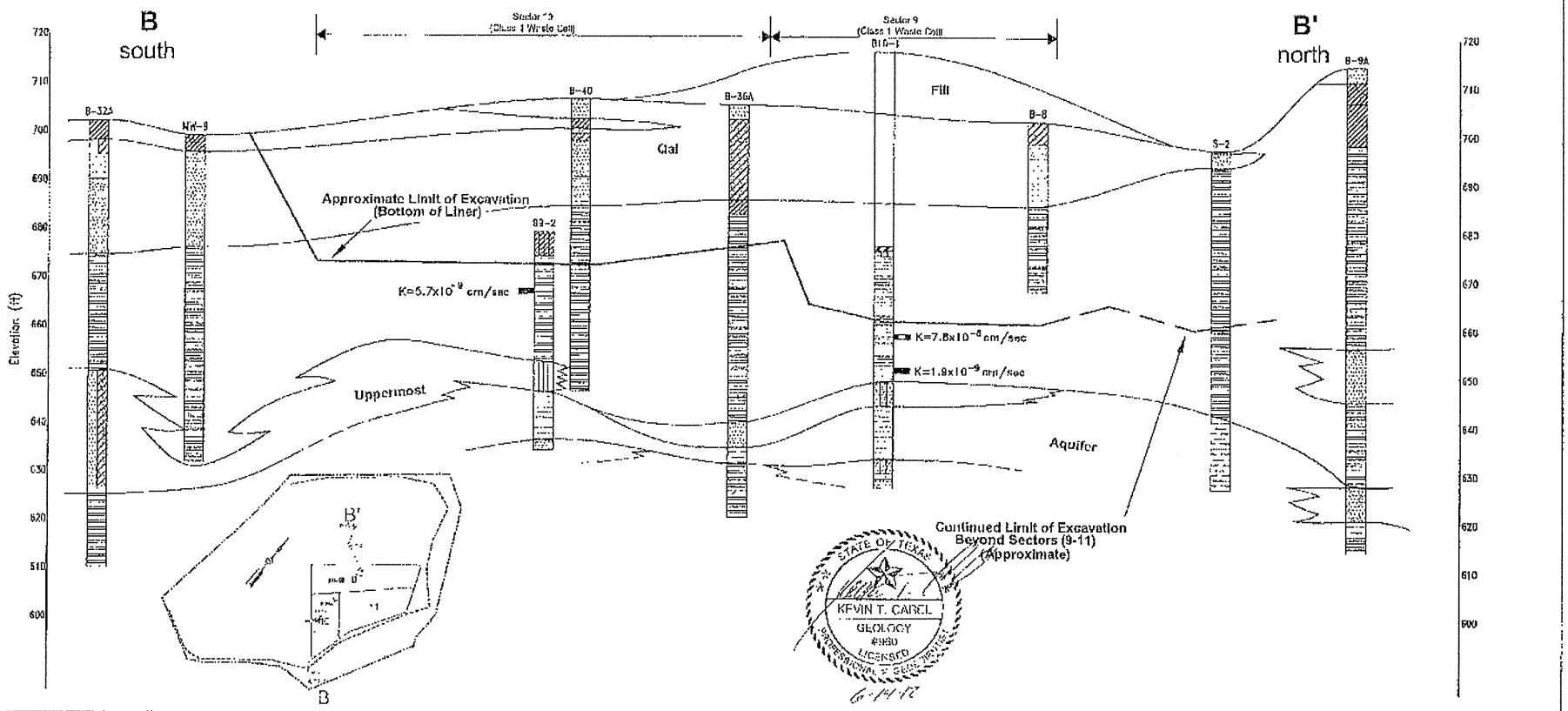
SCALE (feet)

Sandy Clay
Sand with Clay
Silty Clay
Sand
Clayey Sand
Sandy Silt
Clay
Sandy or Silty Shale
Silty Sand
Shale
Sandstone
Silt
Gravel
Clay or Clay Shale
No Log
Shelby Tube Sample
Laboratory Permeability
K=1.0x10^-9 cm/sec

GEOLOGIC CROSS SECTION A - A'

TURKEY CREEK LANDFILL
Johnson County, Texas

DATE: May 29, 2012	REV NO: 0
FILENAME:	
DESIGNED BY: SJW	FIGURE
DRAWN BY: SMG	11e.2
CHECKED BY: KTC	
APPROVED BY: KTC	



LEGEND:

Sandy Clay | Sand | Clay | Shale | Gravel
Sand with Clay | Clayey Sand | Sandy or Silty Shale | Sandstone | Clay or Clay Shale
Silty Clay | Sandy Silt | Silty Sand | Silt | No Log

Core Barrel Sample
Shelby Tube Sample
Laboratory Permeability
K=1.9x10^-9 cm/sec

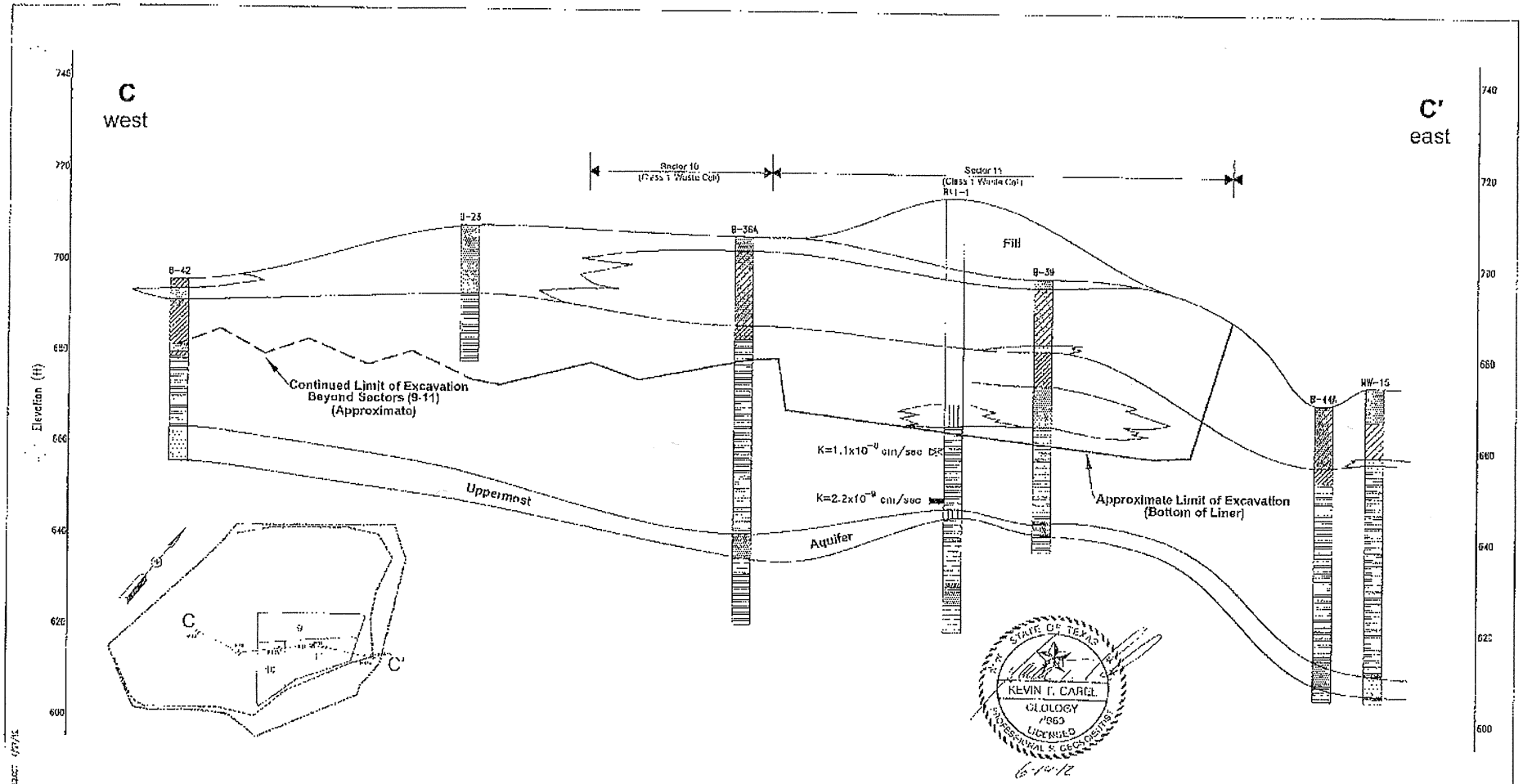
SCALE (feet)
20
0
0
200'

GEOLOGIC CROSS SECTION B-B'

TURKEY CREEK LANDFILL
Johnson County, Texas

DATE: May 29, 2012	REV. NO: 0
FILENAME:	
DESIGNED BY: SJW	FIGURE:
DRAWN BY: SMG	11e.3
CHECKED BY: KTC	
APPROVED BY: KTC	

The CAREL CORPORATION
198 Pecan Street, Keller, TX 76248



CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

SCALE (feet)

LEGEND:

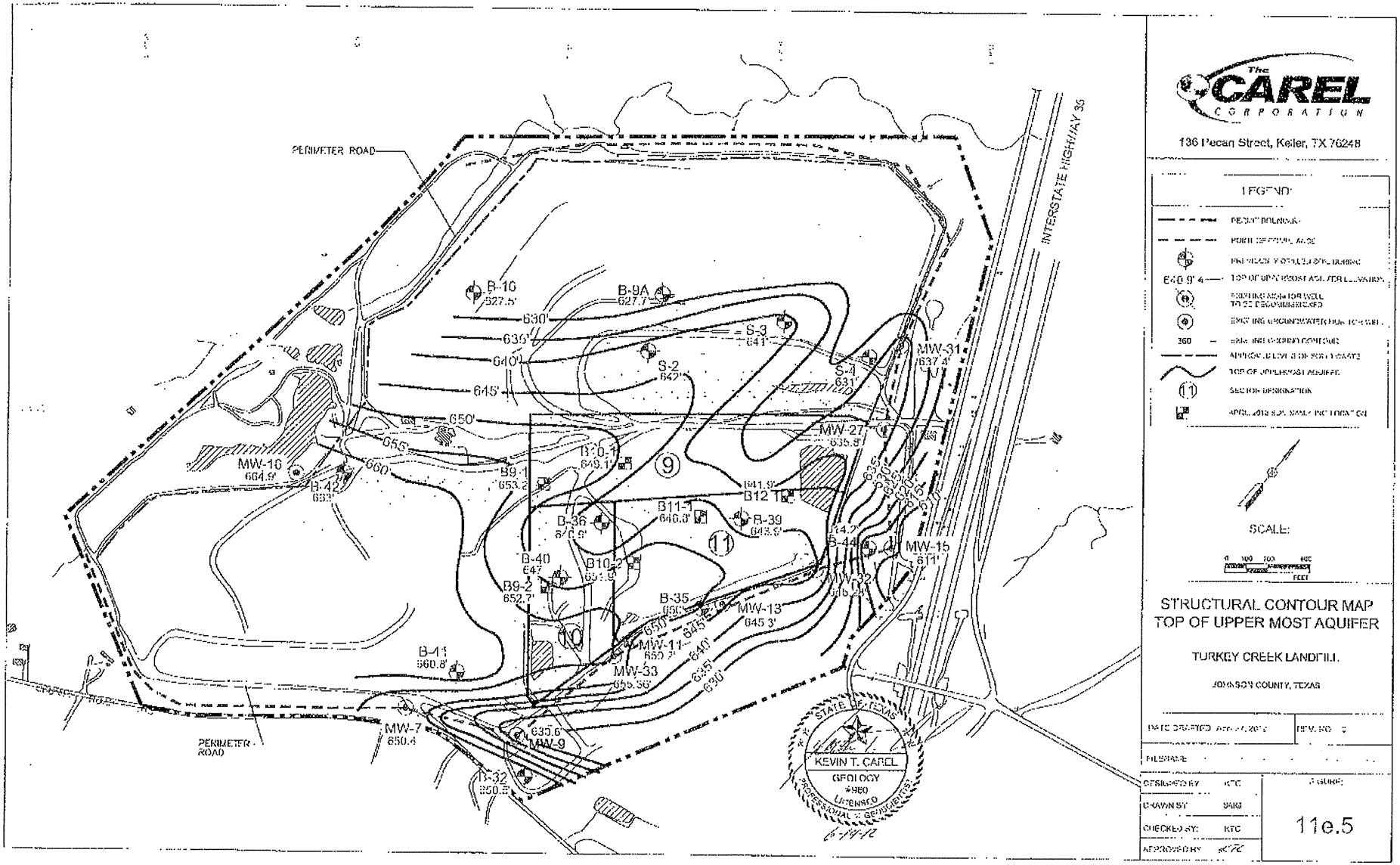
Sandy Clay, Sand, Clay, Shale, Gravel, Sand with Clay, Clayey Sand, Sandy or Silty Shale, Sandstone, Clay or Clay Shale, Silty Clay, Sandy Silt, Silty Sand, Silt, No Log

Split Spoon Sample
Shelby Tube Sample
Laboratory Permeability
K=1.9x10^-9 cm/sec

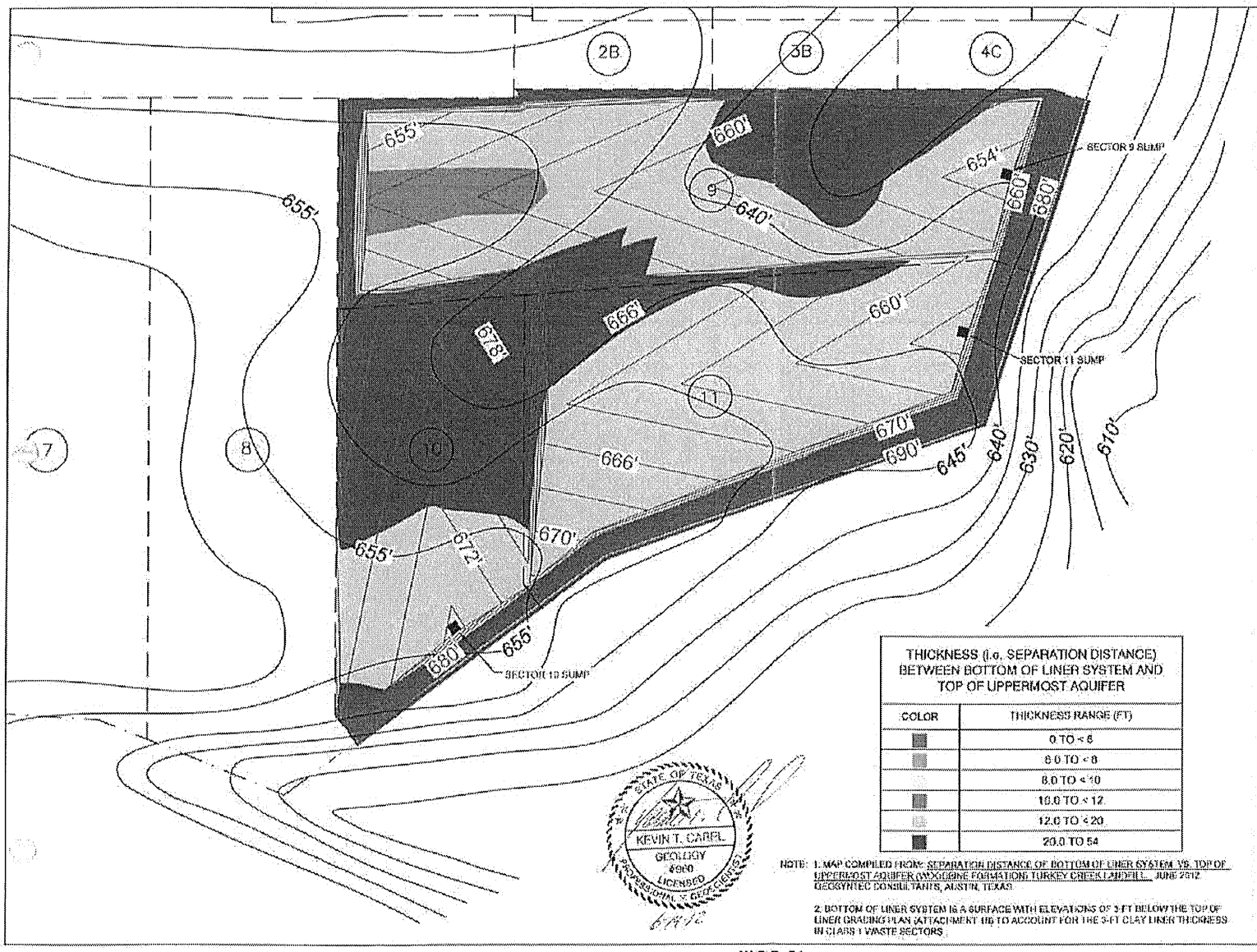
GEOLOGIC CROSS SECTION C-C'

TURKEY CREEK LANDFILL
Johnson County, Texas

DATE: May 29, 2012	REV. NO: 0
FILENAME:	
DESIGNED BY: SJW	FIGURE:
DRAWN BY: SMG	11e.4
CHECKED BY: KTC	
APPROVED BY: KTC	



PERIMETER ROAD
INTERSTATE HIGHWAY 35
B-10
627.5'
B-9A
627.7'
630'
635'
640'
645'
650'
655'
660'
S-3
641'
S-2
642'
S-4
631'
MW-31
637.4'
MW-27
635.8'
MW-16
664.9'
B-42
B9-1
653.2'
B10-1
649.1'
9
641.9'
B12
B11-1
646.8'
B-39
643.9'
11
B-36
B-40
647
B10-2
B9-2
652.7'
B-35
MW-13
645.3'
MW-11
MW-33
B-41
660.8'
10
MW-7
650.4
MW-9
B-32
650.5'
PERIMETER ROAD
STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
SCALE:
STRUCTURAL CONTOUR MAP
TOP OF UPPER MOST AQUIFER
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DESIGNED BY KTC
DRAWN BY SAIG
CHECKED BY: KTC
APPROVED BY KTC
FIGURE:
11e.5



THICKNESS (i.e. SEPARATION DISTANCE) BETWEEN BOTTOM OF LINER SYSTEM AND TOP OF UPPERMOST AQUIFER	
COLOR	THICKNESS RANGE (FT)
	0 TO < 6
	6.0 TO < 8
	8.0 TO < 10
	10.0 TO < 12
	12.0 TO < 20
	20.0 TO 54

NOTE: 1. MAP COMPILED FROM: SEPARATION DISTANCE OF BOTTOM OF LINER SYSTEM VS. TOP OF UPPERMOST AQUIFER (WOODBINE FORMATION) TURKEY CREEK LANDFILL, JUNE 2012 GEOSYNTEC CONSULTANTS, AUSTIN, TEXAS

2. BOTTOM OF LINER SYSTEM IS A SURFACE WITH ELEVATIONS OF 3 FT BELOW THE TOP OF LINER GRADING PLAN (ATTACHMENT IIB) TO ACCOUNT FOR THE 3-FT CLAY LINER THICKNESS IN CLASS 1 WASTE SECTORS

STATE OF TEXAS
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136 Pecan Street, Keller, TX 76248

LEGEND:

- LANDFILL SIDESLOPE
- SECTOR DIVIDING LINE
- 657 — BOTTOM OF EXCAVATION (BOTTOM OF LINER SYSTEM ELEVATION (NOTE 2) (FT, MSL))
- 648 — TOP OF UPPERMOST AQUIFER (WOODBINE FORMATION)
- (11) SECTOR DESIGNATION

SCALE:

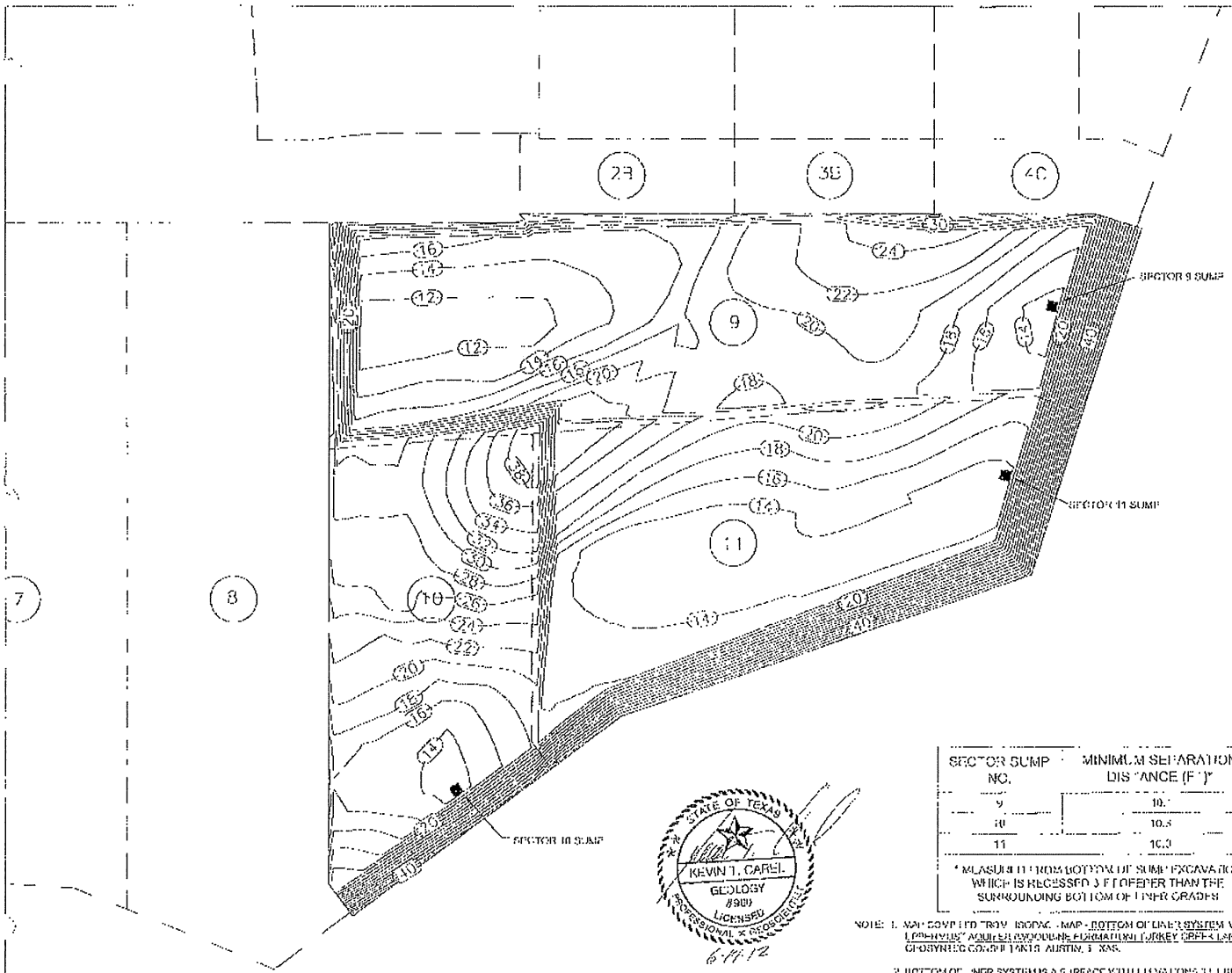
0 50 100 200 FEET

SEPARATION DISTANCES BOTTOM OF LINER VS. TOP OF AQUIFER (WOODBINE FORMATION)

TURKEY CREEK LANDFILL

JOHNSON COUNTY, TEXAS

DATE DRAFTED: June 11, 2012	REV. NO.: 0
FILENAME:	
DESIGNED BY:	FIGURE:
DRAWN BY:	11e.6
CHECKED BY: KTC	
APPROVED BY:	



SECTOR SUMP NO.	MINIMUM SEPARATION DISTANCE (FT)*
9	10.5
10	10.5
11	10.0

* MEASURED FROM BOTTOM OF SUMP EXCAVATION WHICH IS RECESSED 3 FT DEEPER THAN THE SURROUNDING BOTTOM OF LINER GRADES

STATE OF TEXAS
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#980
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PROFESSIONAL GEOSCIENTIST
6-11-12

NOTE: 1. MAP COMPILED FROM ISOPAC MAP - BOTTOM OF LINER SYSTEM VS. TOP OF UPPERMOST AQUIFER (WOODBINE FORMATION) TURKEY CREEK LANDFILL JUNE 2012 GROUNDWATER CONSULTANTS AUSTIN, TEXAS.

2. BOTTOM OF LINER SYSTEM IS A SURFACE WITH ELEVATIONS 3 FT BELOW THE TOP OF LINER GRADING PLAN (ATTACHMENT 1B) TO ACCOUNT FOR THE 3-FT CLAY LINER THICKNESS IN CLASS I WASTE SECTORS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- LANDFILL SIDESLOPE
- SECTOR OUTLINE
- (20) ISOPACH CONTOUR OF THICKNESS (i.e. SEPARATION DISTANCE, FT, BETWEEN BOTTOM OF LINER SYSTEM AND TOP OF UPPERMOST AQUIFER)
- (11) SECTOR DESIGNATION

SCALE:

0 50 100 200 FEET

ISOPACH MAP
BOTTOM OF LINER VS. TOP OF AQUIFER
(WOODBINE FORMATION)

TURKEY CREEK LANDFILL

JOHNSON COUNTY, TEXAS

DATE DRAFTED: JUNE 11, 2012	REV. NO.: 0
FILENAME:	
DESIGNED BY:	FIGURE
DRAWN BY:	
CHECKED BY: KTC	11e.7
APPROVED BY: KTC	

APPENDIX 11e.A

BORING LOGS

LOG OF BORING NO. B9-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill — Northing: -283.69
Top of PVC El.: — Easting: 914.19
Surface El.: 883,202 feet MSL
Completion Depth: 45 feet
Date Boring Started: 4/23/2012
Date Boring Completed: 4/23/2012

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lbs/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			SHALE, dark grayish black, dry						
5			silty and fissile in parts from 5 to 17 feet below ground surface						
10				1.4E-8	116	59	24	35	99.4
15			dark grayish black with grayish green, some very fine grained pyrite and carbon wood fragments present, fossiliferous						
20									
25			SILT, light gray to medium gray, dry, friable						
30			SHALE, grayish green, dry, fissile						
			SILT, medium gray, moist to wet, friable						
35			SHALE AND SILT, medium gray, moist to wet, interlayered and somewhat friable						
40			▽ SAND, medium gray, well sorted, rounded, very fine to fine grained, wet						
45									
50									

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/23/12	840.202

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 11 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 6/14/12

LOG OF BORING NO. B9-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▽ Water level after drilling.

LOG OF BORING NO. B9-2

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 670.694 feet MSL
Completion Depth: 45 feet
Date Boring Started: 4/19/2012
Date Boring Completed: 4/19/2012

Northing: -753.52
Easting: 934.12

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			SILTY CLAY, dark gray, dry						
5			SHALE, dark grayish black to medium gray, dry						
10				5.7E-9	109	58	23	35	99.9
15									
20			very fine grained pyrite along bedding planes from 20 to 24 feet below ground surface						
25			slightly silty and medium to light gray from 24 to 27 feet below ground surface						
30			SILT, light greenish gray, dry to slightly moist, very friable						
35			SHALE AND SILT, light gray to medium gray, moist to wet, interlayered						
40			slightly moist at 40 feet below ground surface						
45			SAND, light gray, well sorted, rounded, fine to medium grained, wet						
50									

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA
Sampling Method: Continuous
Geologist: Michael J. Hub, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/19/12	636.694

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 12 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL2.GDT 5/4/12

LOG OF BORING NO. B9-2
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B10-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 717.064 feet MSL
Completion Depth: 90 feet
Date Boring Started: 4/17/2012
Date Boring Completed: 4/17/2012

Northing: -162.45
Easting: 1293.10

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 40 feet below ground surface. No log.						
40			CLAY, dark reddish brown, dry						
45			SILTY SAND, reddish brown, well sorted, rounded, very fine grained, dry silty and friable with some very fine grained pyrite from 42 to 48 feet below ground surface						
50			SHALE, dark gray to light gray, dry fissile from 48 to 53 feet below ground surface very hard drilling, fissile with chert nodules from 53 to 57 feet below ground surface some thin calcareous seams from 57 to 58 feet below ground surface silty with fossils and very fine grained pyrite from 58 to 60 feet below ground surface	7.8E-8	116	41	15	26	70.4
60			fossiliferous with some pyrite and carbon wood fragments present from 63 to 66 feet below ground surface slightly silty with some thin glauconitic sheets from 66 to 68 feet below ground surface	1.9E-9	117	57	21	36	98.1
70			SILTY SAND, light gray to medium gray, moderately well to well sorted, rounded, very fine grained, moist to wet, some thin shale seams present						
75			SHALE AND SILT, light gray to dark gray, moderately well sorted, rounded, dry to slightly moist, some very fine sand, interlayered						
85			SILTY SAND, light gray to dark grayish black, well sorted, rounded, very fine grained, wet, some thin shale seams present						
90			SHALE, dark grayish black						
95			SAND, light gray, well sorted, rounded, very fine to fine grained, wet						

KEVIN T. CAREL
GEOLOGY
#960
LICENSED
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STATE OF TEXAS
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/17/12	647.064
04/17/12	633.064

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube samples at 53 and 65 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK GPJ CAREL2.GDT 5/11/12

LOG OF BORING NO. B10-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries in situ the transition may be gradual

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▽ Water level after drilling.

LOG OF BORING NO. B10-2

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC EL:
Surface El.: 709.922 feet MSL
Completion Depth: 75 feet
Date Boring Started: 4/18/2012
Date Boring Completed: 4/18/2012

Northing: -639.05
Easting: 1339.47

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu. ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 40 feet below ground surface. No log.						
40			SHALE, grayish green to dark grayish black, dry, tight and hard - slow drilling some chert nodules and thin silt layers from 40 to 50 feet below ground surface						
50			fossiliferous with some very fine grained pyrite and carbon wood fragments present from 52 to 55 feet below ground surface silty and moist at 55 feet below ground surface	3.0E-8	115	33	15	18	95.6
55			SILT, light gray, well sorted, rounded, moist to dry						
60			SHALE AND SILT, light gray and medium gray, dry, interlayered, hard drilling						
70			SILT, light gray, well sorted, rounded, slightly moist						
70			SAND, light gray and brown, well sorted, rounded, fine grained, wet						
75			SHALE, medium gray and light gray						
75			SAND, light gray, well sorted, rounded, fine grained, wet						

STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hull, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/18/12	638.922
04/18/12	636.922

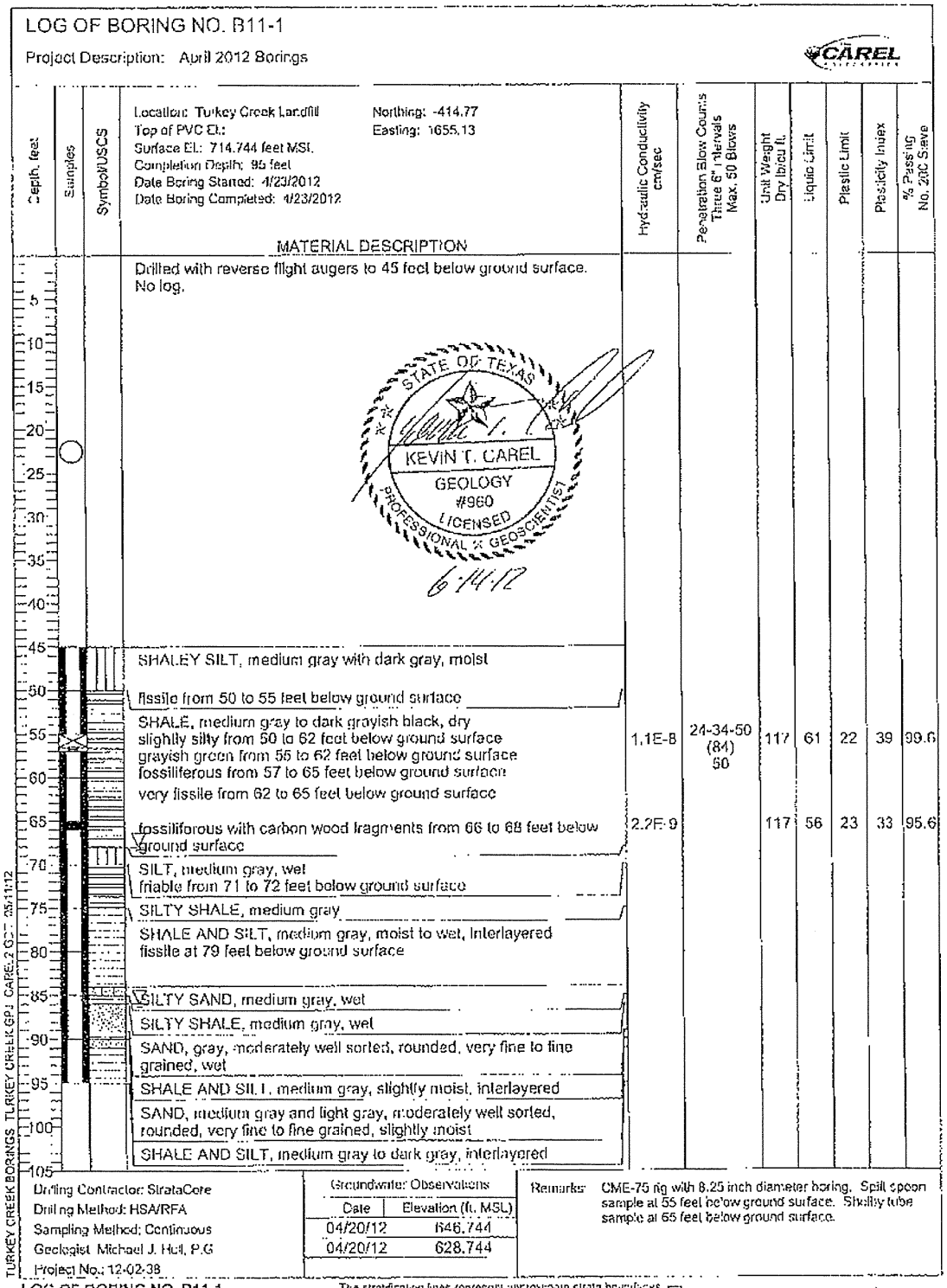
Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 50 feet below ground surface.

The stratification lines represent approximate strata boundaries in situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

TURKEY CREEK BORINGS_TURKEY CREEK.GPJ_CAREL2.GDT 05/11/12

LOG OF BORING NO. B10-2
PAGE 1 of 1



LOG OF BORING NO. B11-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 714.744 feet MSL
Completion Depth: 95 feet
Date Boring Started: 4/23/2012
Date Boring Completed: 4/23/2012

Northing: -414.77
Easting: 1655.13

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Penetration Blow Counts Three 6" Intervals Max. 50 Blows	Unit Weight Dry lb/cu ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
			Drilled with reverse flight augers to 45 feet below ground surface. No log.							
45			SHALEY SILT, medium gray with dark gray, moist							
50			fissile from 50 to 55 feet below ground surface							
55			SHALE, medium gray to dark grayish black, dry slightly silty from 50 to 62 feet below ground surface grayish green from 55 to 62 feet below ground surface fossiliferous from 57 to 65 feet below ground surface very fissile from 62 to 65 feet below ground surface	1.1E-8	24-34-50 (84) 50	117	61	22	39	99.6
60										
65			fossiliferous with carbon wood fragments from 66 to 68 feet below ground surface	2.2E-9		117	56	23	33	95.6
70			SILT, medium gray, wet friable from 71 to 72 feet below ground surface							
75			SILTY SHALE, medium gray							
80			SHALE AND SILT, medium gray, moist to wet, interlayered fissile at 79 feet below ground surface							
85			SILTY SAND, medium gray, wet							
			SILTY SHALE, medium gray, wet							
90			SAND, gray, moderately well sorted, rounded, very fine to fine grained, wet							
95			SHALE AND SILT, medium gray, slightly moist, interlayered							
100			SAND, medium gray and light gray, moderately well sorted, rounded, very fine to fine grained, slightly moist							
105			SHALE AND SILT, medium gray to dark gray, interlayered							

KEVIN T. CAREL
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#960
LICENSED
PROFESSIONAL GEOSCIENTIST
STATE OF TEXAS

6/14/12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hall, P.G
Project No.: 12-02-38

Groundwater Observations

Date	Elevation (ft. MSL)
04/20/12	646.744
04/20/12	628.744

Remarks: CME-75 rig with 8.25 inch diameter boring. Split spoon sample at 55 feet below ground surface. Shelby tube sample at 65 feet below ground surface.

TURKEY CREEK BORINGS TURKEY CREEK.GPJ CAREL.2.GDT 5/11/12

LOG OF BORING NO. B11-1
PAGE 1 of 1

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

LOG OF BORING NO. B12-1

Project Description: April 2012 Borings

CAREL

Location: Turkey Creek Landfill
Top of PVC El.:
Surface El.: 690.883 feet MSL
Completion Depth: 80 feet
Date Boring Started: 4/19/2012
Date Boring Completed: 4/19/2012

Northing: -311.86
Easting: 2068.82

Depth, feet	Samples	Symbol/USCS	MATERIAL DESCRIPTION	Hydraulic Conductivity cm/sec	Unit Weight Dry lb/cu.ft.	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve
0			Drilled with reverse flight augers to 25 feet below ground surface. No log.						
25			SAND, reddish brown, well sorted, rounded, medium grained, wet						
			silty from 28 to 30 feet below ground surface						
30			SHALE, light gray to dark grayish black, dry fissile from 30 to 35 feet below ground surface						
35			fossiliferous from 36 to 40 feet below ground surface fossiliferous from 37 to 39 feet below ground surface	7.9E-9	110	61	21	40	99.8
40			fissile from 40 to 48 feet below ground surface slightly silty from 42 to 48 feet below ground surface						
45			silty and medium grayish green from 48 to 49 feet below ground surface						
50			SILTY SAND, medium grayish green, moderately well sorted, rounded, very fine grained, slightly moist						
			No recovery from core barrel						
55			SILT, grayish green, slightly moist						
60			SILTY SHALE, medium gray, fissile						
			SILTY SAND, light grayish green, well sorted, rounded, very fine grained, wet to moist						
65			SHALE AND SILT, light gray and medium gray, fissile, interlayered, carbon wood fragments at 70 feet below ground surface						
70			SHALE, grayish black, fossiliferous with carbon wood fragments present						
75			SAND, medium gray, moderately well sorted, rounded, fine grained, wet						
80									
85									

KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
STATE OF TEXAS
6-14-12

Drilling Contractor: StrataCore
Drilling Method: HSA/RFA
Sampling Method: Continuous
Geologist: Michael J. Hall, P.G.
Project No.: 12-02-38

Groundwater Observations	
Date	Elevation (ft. MSL)
04/19/12	675.883
04/19/12	629.883
04/19/12	611.883

Remarks: CME-75 rig with 8.25 inch diameter boring. Shelby tube sample at 35 feet below ground surface.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual.

▽ Water level at time of drilling.
▼ Water level at end of drilling.
▼ Water level after drilling.

L:\TURKEY CREEK BORINGS_TURKEY CREEK.GPJ CAREL2.GDT 5/11/12

LOG OF BORING NO. B12-1
PAGE 1 of 1

APPENDIX 11e.B

STATE OF TEXAS WELL REPORTS

STATE OF TEXAS WELL REPORT for Tracking #284903

Owner:	Turkey Creek Landfill	Owner Well #:	B9-1
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/19/2012 Completed: 4/19/2012
Diameter of Hole:	Diameter: 8 1/4 in From Surface To 45 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0 45 - 0 2 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

TEX. OCC. CODE Title 12, Chapter 1901.251, authorizes the owner (owner or the person for whom the well was drilled) to keep information in Well Reports confidential. The Department shall hold the contents of the well log confidential and not a matter of public record if it receives, by certified mail, a written request to do so from the owner.

Please include the report's Tracking number (Tracking #284903) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft)	To (ft)	Description
0	24'	Dk Grayish Black Shale
24	29'	Lt. Gray Silt
29	30'	Grayish Green Shale
30	32'	Med Gray Silt
32	43'	Med Gray Shale & Silt
43	45'	Med Gray Sand

CASING, BLANK PIPE & WELL SCREEN DATA

No Data

STATE OF TEXAS WELL REPORT for Tracking #284904

Owner:	Turkey Creek Landfill	Owner Well #:	B9-2
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/20/2012 Completed: 4/20/2012
Diameter of Hole:	Diameter: 8 1/4 in From Surface To 45 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0 45 - 0 2 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #284904) on your written request.

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P.O. Box 12157
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(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL	CASING, BLANK PIPE & WELL SCREEN DATA
From (ft) To (ft) Description 0 - 5' Dk Grayish Silty Clay 5 - 27' Dk Grayish Black Shale 27 - 33' Lt. Greenish Gray Silt 33 - 43' Lt. to Med Gray Shale & Silt 43 - 45' Lt. Gray Sand	No Data

STATE OF TEXAS WELL REPORT for Tracking #284896

Owner:	Turkey Creek Landfill	Owner Well #:	B10-1
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/17/2012 Completed: 4/17/2012
Diameter of Hole:	Diameter: 8 1/4 In From Surface To 90 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0 90 - 0 3 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #284896) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL	CASING, BLANK PIPE & WELL SCREEN DATA
From (ft) To (ft) Description 0 - 40' No Log 40 - 41' Dk Reddish Brown Clay 41 - 42' Reddish Brown Silty Sand 42 - 68' Dk Gray Shale 68 - 73' Lt. Gray Silty Sand 73 - 84' Lt. Gray Shale & Silt 84 - 87' Lt. Gray Silty Sand 87 - 88' Dk Grayish Black Shale 88 - 90' Lt. Gray Sand	No Data

STATE OF TEXAS WELL REPORT for Tracking #284898

Owner:	Turkey Creek Landfill	Owner Well #:	B10-2
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/18/2012 Completed: 4/18/2012
Diameter of Hole:	Diameter: 8 1/4 in From Surface To 75 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0.75 - 0.3 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 - 40' No Log
40 - 57' Grayish Green Dk Grayish Black Shale
57 - 61' Lt. Gray Silt
61 - 69' Lt. Gray Shale & Silt
69 - 71' Lt. Gray Silt
71 - 72' Lt. Gray & Brown Sand
72 - 73' Med Gray Sand
73 - 75' Lt. Gray Sand

CASING, BLANK PIPE & WELL SCREEN DATA

No Data

STATE OF TEXAS WELL REPORT for Tracking #284900

Owner:	Turkey Creek Landfill	Owner Well #:	B11-1
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/18/2012 Completed: 4/18/2012
Diameter of Hole:	Diameter: 8 1/4 in From Surface To 95 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0 95 - 0 3 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #284900) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL

From (ft) To (ft) Description
0 - 45' No Log
45 - 50' Med Gray Shaley Silt
50 - 68' Med Gray Shale
68 - 70' Med Gray Silt
70 - 75' Med Gray Silty Shale
75 - 84' Med Gray Shale & Silt
84 - 85' Med Gray Silty Sand
85 - 86' Med Gray Silty Shale
86 - 89' Rounded Sand
89 - 90' Med Gray Shale & Silt
90 - 91' Med Gray Sand
91 - 95' Med Gray Shale & Silt

CASING, BLANK PIPE & WELL SCREEN DATA

No Data

STATE OF TEXAS WELL REPORT for Tracking #284902

Owner:	Turkey Creek Landfill	Owner Well #:	B12-1
Address:	9100 S. I-35 West Alvarado , TX 76009	Grid #:	32-47-2
Well Location:	9100 S. I-35 West Alvarado , TX 76009	Latitude:	32° 21' 17" N
Well County:	Johnson	Longitude:	097° 12' 10" W
Elevation:	717 ft.	GPS Brand Used:	Google Earth
Type of Work:	New Well	Proposed Use:	Environmental Soil Boring

Drilling Date:	Started: 4/19/2012 Completed: 4/19/2012
Diameter of Hole:	Diameter: 8 1/4 in From Surface To 80 ft
Drilling Method:	Hollow Stem Auger
Borehole Completion:	No Data
Annular Seal Data:	1st Interval: No Data 2nd Interval: No Data 3rd Interval: No Data
Surface Completion:	No Data
Water Level:	Static level: No Data Artesian flow: No Data
Packers:	No Data
Plugging Info:	Casing left in well: Cement/Bentonite left in well: From (ft) To (ft) From (ft) To (ft) Cem/Bent Sacks Used 0 - 0 80 - 0 3 Grout
Type Of Pump:	No Data
Well Tests:	No Data
Water Quality:	Type of Water: No Data Depth of Strata: No Data Chemical Analysis Made: No Data Did the driller knowingly penetrate any strata which contained undesirable constituents: No
Certification Data:	The driller certified that the driller drilled this well (or the well was drilled under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	Strata Core Services 5070 Brush Creek Rd. Fort Worth , TX 76119
Driller License Number:	5003

Licensed Well Driller Signature:	Jon Storm
Registered Driller Apprentice Signature:	No Data
Apprentice Registration Number:	No Data
Comments:	No Data

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING CONFIDENTIALITY

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Please include the report's Tracking number (Tracking #284902) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

DESC. & COLOR OF FORMATION MATERIAL	CASING, BLANK PIPE & WELL SCREEN DATA
From (ft) To (ft) Description	No Data
0 - 25' No Log	
25 - 28' Reddish Brown Sand	
28 - 49' Lt. Gray to Dk Gray Black Shale	
49 - 50' Med Grayish Green Silty Sand	
50 - 55' No Recovery	
55 - 59' Grayish Green Silt	
59 - 61' Med Gray Silty Shale	
61 - 65' Lt. Grayish Green Silty Sand	
65 - 73' Lt. Gray Shale & Silt	
73 - 79' Grayish Black Shale	
79 - 80' Med Gray Sand	

APPENDIX 11e.C

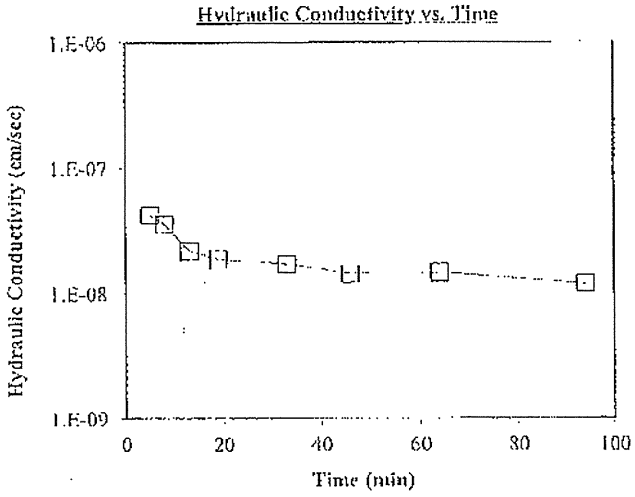
LABORATORY RESULTS

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B9-1-11

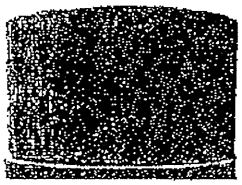
TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 05/02/12



INITIAL VALUES	
Avg. Sample Height (in)	1.71
Avg. Sample Diameter (in)	2.72
Wet Weight (g)	349.5
Area (in^2)	5.79
Volume (cc)	162.5
Initial Water Content (%)	15.9
Total Density (pcf)	134.2
Dry Density (pcf)	115.8
G_s (assumed)	2.65
Degree of Saturation (%)	98.4
Void Ratio	0.43
Porosity	0.30
1 Pore Volume (cc)	48.7

Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
5	4.2E-08
8	3.6E-08
13	2.2E-08
19	1.9E-08
33	1.7E-08
46	1.4E-08
64	1.5E-08
94	1.2E-08
Average[1]:	1.4E-08



Note: A B value of 0.95 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 05/02/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

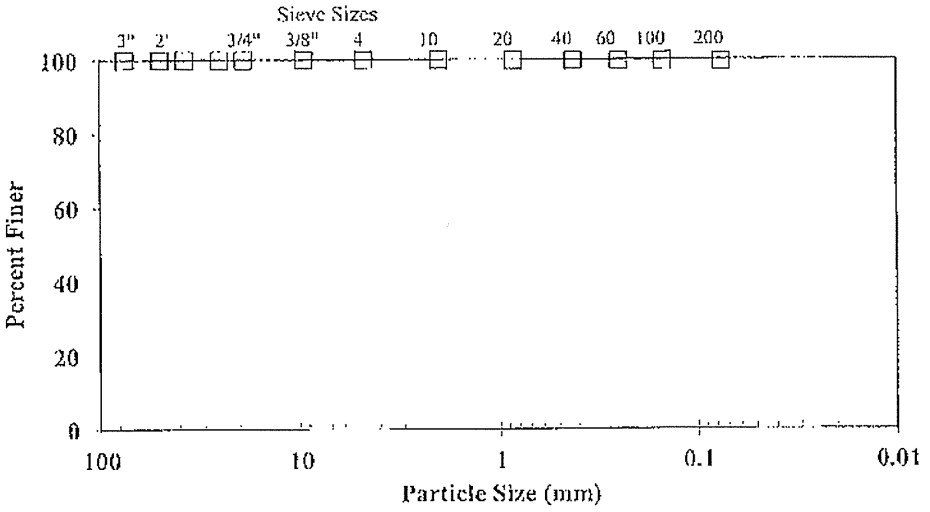
9063 Bee Caves Road Austin, TX 78733-6201 (512) 263-2101 | (512) 263-2558 1-800-880-TEST

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carol Corporation
Project: Turkey Creek Landfill
Sample: B9-1-11

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 05/02/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	99.9
No. 40 (425 µm)	99.8
No. 60 (250 µm)	99.7
No. 100 (150 µm)	99.7
No. 200 (75 µm)	99.4

Notes: Soil classifies as fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	59
Plastic Limit	24
Plastic Index	35
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 05/04/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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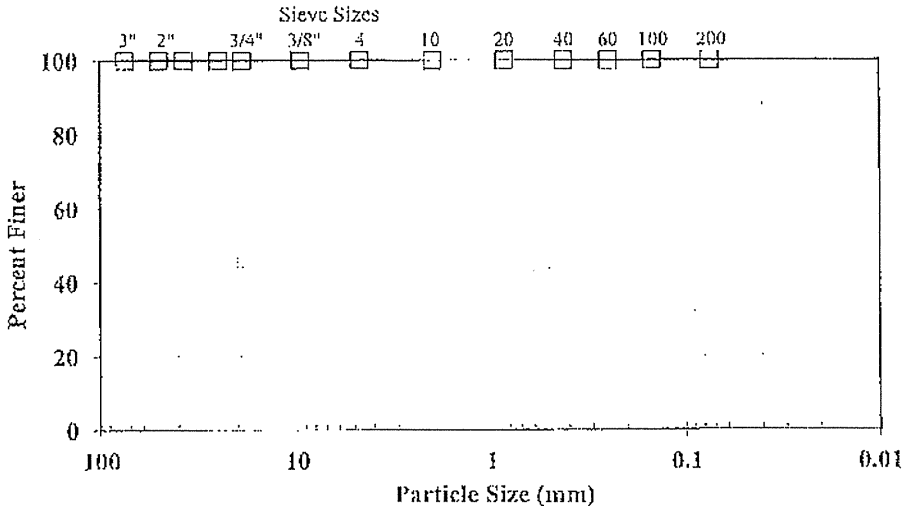
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B9-2-12

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 04/26/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	100.0
No. 40 (425 µm)	100.0
No. 60 (250 µm)	100.0
No. 100 (150 µm)	99.9
No. 200 (75 µm)	99.9

Notes: Soil classifies as fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	58
Plastic Limit	23
Plastic Index	35
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 04/30/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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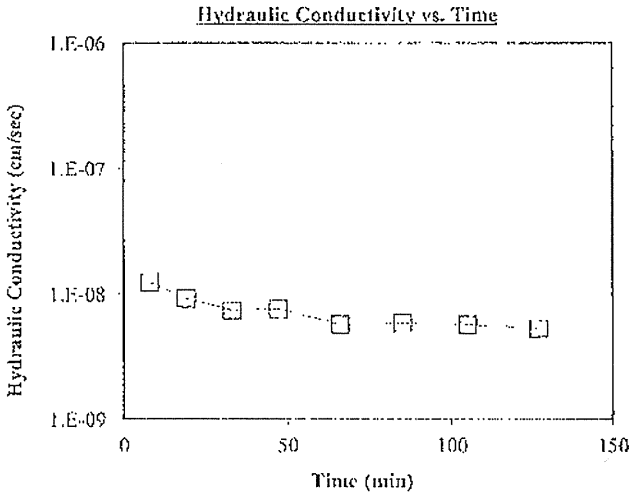
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B9-2-12

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 04/27/12



INITIAL VALUES	
Avg. Sample Height (in)	1.76
Avg. Sample Diameter (in)	2.80
Wet Weight (g)	360.0
Area (in^2)	6.14
Volume (cc)	176.5
Initial Water Content (%)	16.4
Total Density (pcf)	127.3
Dry Density (pcf)	109.3
G_s (assumed)	2.65
Degree of Saturation (%)	85.0
Void Ratio	0.51
Porosity	0.34
1 Pore Volume (cc)	59.8



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
8	1.2E-08
19	9.2E-09
33	7.4E-09
47	7.6E-09
66	5.7E-09
85	5.9E-09
105	5.7E-09
127	5.3E-09
Average[1]:	5.7E-09

Note: A B-value of 0.97 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 04/27/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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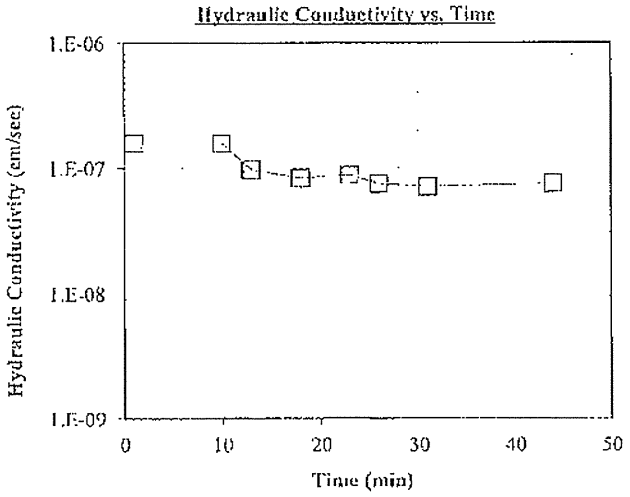
9063 Bee Caves Road Austin, TX 78733-6201 (512) 263-2101 | (512) 263-2558 1-800-880-TEST

TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

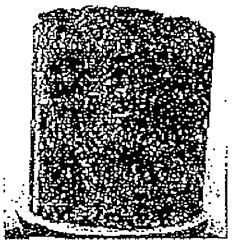
Hydraulic Conductivity

Client: The Carol Corporation
Project: Turkey Creek Landfill
Sample: B10-1-58.5

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 05/03/12



INITIAL VALUES	
Avg. Sample Height (in)	3.38
Avg. Sample Diameter (in)	3.07
Wet Weight (g)	810.8
Area (in^2)	7.40
Volume (cc)	409.0
Initial Water Content (%)	6.3
Total Density (pcf)	123.7
Dry Density (pcf)	116.4
G_s (assumed)	2.65
Degree of Saturation (%)	39.6
Void Ratio	0.42
Porosity	0.30
1 Pore Volume (cc)	121.0



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
1	1.6E-07
10	1.6E-07
13	9.8E-08
18	8.4E-08
23	8.9E-08
26	7.5E-08
31	7.1E-08
44	7.5E-08
Average[1]:	7.8E-08

Note: A B-value of 0.99 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 05/03/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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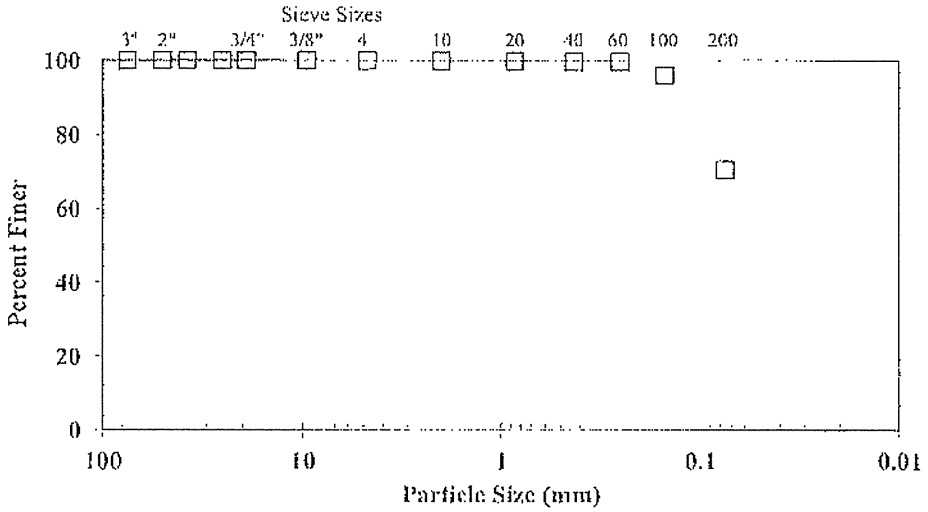
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B10-1-58.5

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 05/03/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	99.9
No. 40 (425 µm)	99.8
No. 60 (250 µm)	99.7
No. 100 (150 µm)	96.1
No. 200 (75 µm)	70.4

Notes: Soil classifies as lean clay (CL) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	41
Plastic Limit	15
Plastic Index	26
Notes: Specimen was air dried. 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 05/04/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

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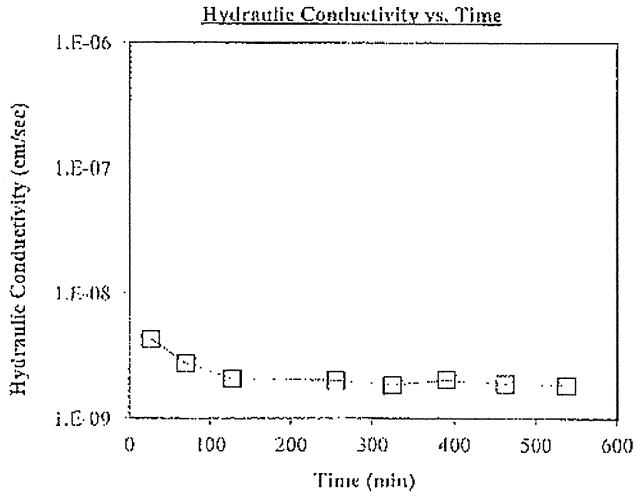
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

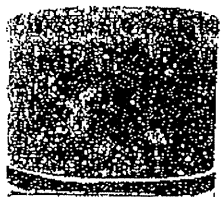
Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B10-1-65

TRI Log#: E2365-20-05
Test Method: ASTM D 5084, Method F
Test Date: 04/20/12



INITIAL VALUES	
Avg. Sample Height (in)	2.00
Avg. Sample Diameter (in)	2.76
Wet Weight (g)	424.0
Area (in^2)	5.98
Volume (cc)	195.7
Initial Water Content (%)	15.4
Total Density (pcf)	135.2
Dry Density (pcf)	117.1
G_s (assumed)	2.65
Degree of Saturation (%)	99.4
Void Ratio	0.41
Porosity	0.29
1 Pore Volume (cc)	57.1



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
27	4.3E-09
70	2.8E-09
128	2.1E-09
255	2.0E-09
375	1.9E-09
390	2.1E-09
462	1.9E-09
538	1.9E-09
Average[1]:	1.9E-09

Note: A B-value of 0.97 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 04/23/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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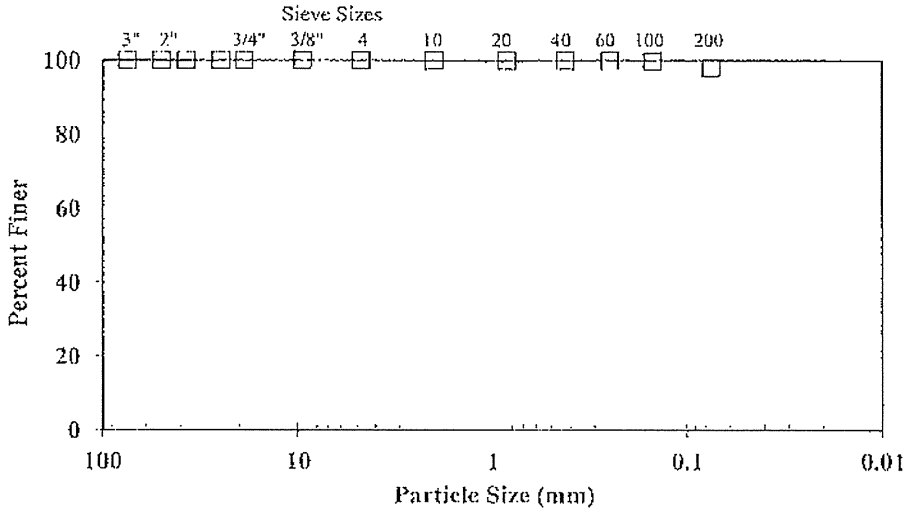
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B10-1-65

TRI Log#: E2365-20-05
Test Method: ASTM D 422
Test Date: 04/23/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	100.0
No. 40 (425 µm)	100.0
No. 60 (250 µm)	100.0
No. 100 (150 µm)	99.7
No. 200 (75 µm)	98.1

Notes: Soil classifies as a fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	57
Plastic Limit	21
Plastic Index	36
Notes: Specimen was air dried. 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 04/23/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

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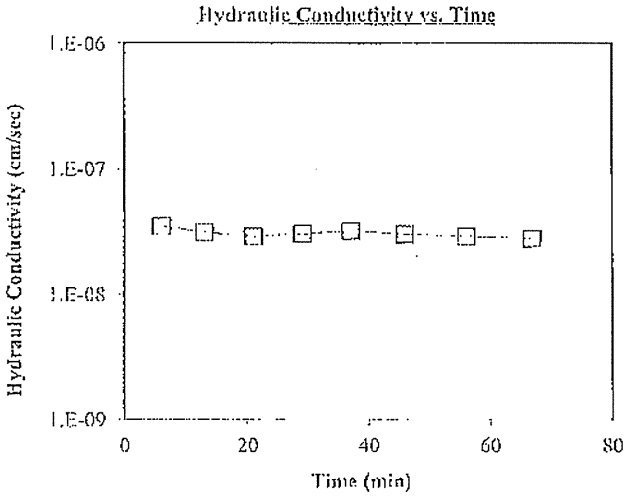
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

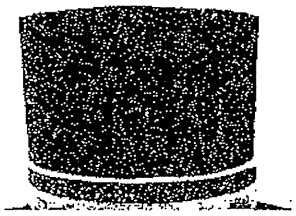
Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B10-2-50

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 04/27/12



INITIAL VALUES	
Avg. Sample Height (in)	1.71
Avg. Sample Diameter (in)	2.73
Wet Weight (g)	341.2
Area (in^2)	5.85
Volume (cc)	163.6
Initial Water Content (%)	13.3
Total Density (pcf)	130.2
Dry Density (pcf)	114.9
G_s (assumed)	2.65
Degree of Saturation (%)	80.3
Void Ratio	0.44
Porosity	0.30
Pore Volume (cc)	49.9



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
6	3.5E-08
13	3.1E-08
21	2.9E-08
29	3.0E-08
37	3.2E-08
46	3.0E-08
56	2.9E-08
67	2.8E-08
Average[1]:	3.0E-08

Note: A B-value of 0.98 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 04/27/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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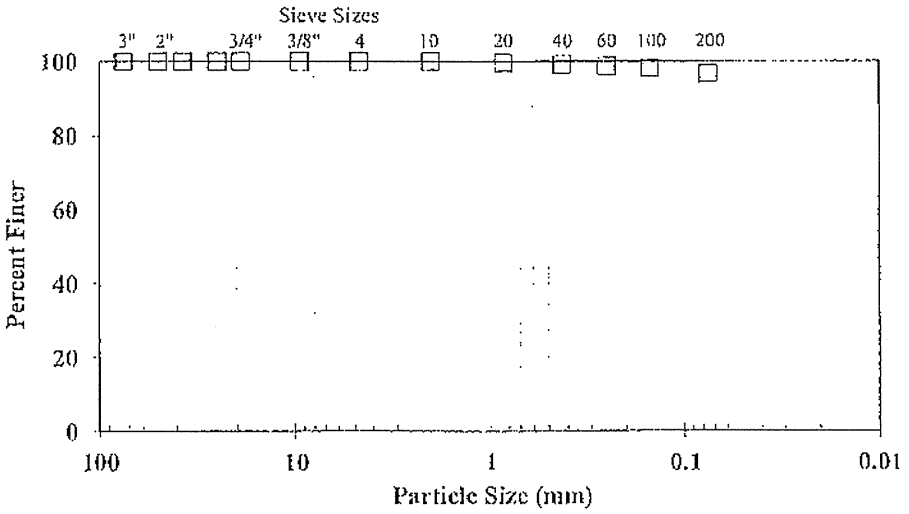
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B10-2-50

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 04/26/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	99.6
No. 40 (425 µm)	99.1
No. 60 (250 µm)	98.7
No. 100 (150 µm)	98.2
No. 200 (75 µm)	96.6

Notes: Soil classifies as lean clay (CL) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	33
Plastic Limit	15
Plastic Index	18
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 05/01/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

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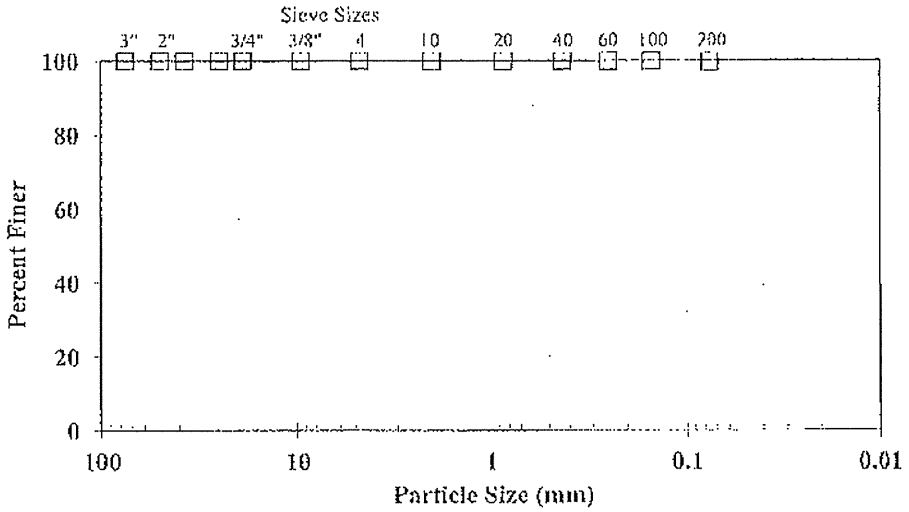
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B11-1-55

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 05/01/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	99.9
No. 20 (850 µm)	99.9
No. 40 (425 µm)	99.8
No. 60 (250 µm)	99.8
No. 100 (150 µm)	99.8
No. 200 (75 µm)	99.6

Notes: Soil classifies as fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	61
Plastic Limit	22
Plastic Index	39
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 05/01/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

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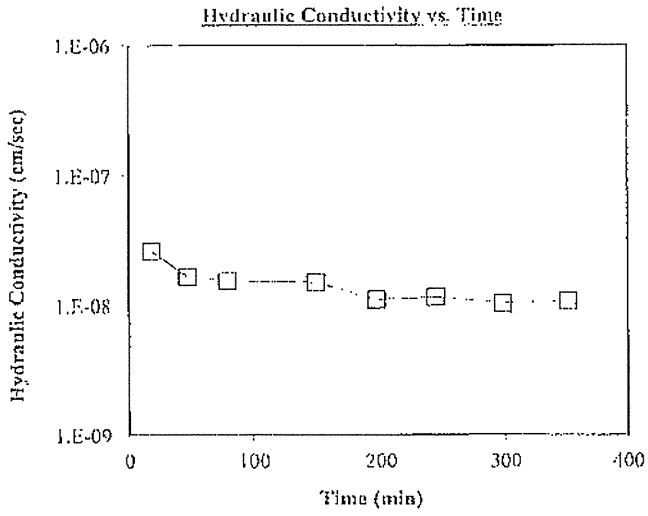
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

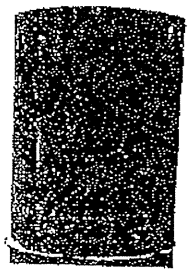
Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B11-1-55

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 05/04/12



INITIAL VALUES	
Avg. Sample Height (in)	2.06
Avg. Sample Diameter (in)	1.39
Wet Weight (g)	110.3
Area (in^2)	1.51
Volume (cc)	51.2
Initial Water Content (%)	15.0
Total Density (pcf)	134.6
Dry Density (pcf)	117.1
G_s (assumed)	2.65
Degree of Saturation (%)	96.0
Void Ratio	0.41
Porosity	0.29
1 Pore Volume (cc)	14.9



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
18	2.6E-08
47	1.7E-08
79	1.5E-08
149	1.5E-08
197	1.1E-08
244	1.2E-08
298	1.0E-08
351	1.1E-08
Average[1]:	1.1E-08

Note: A B-value of 0.96 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 05/04/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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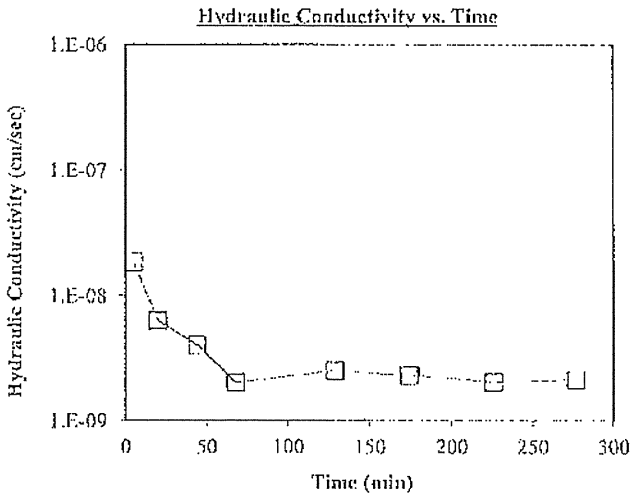
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B11-1-65

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 04/30/12



INITIAL VALUES	
Avg. Sample Height (in)	1.61
Avg. Sample Diameter (in)	2.78
Wet Weight (g)	342.4
Area (in^2)	6.07
Volume (cc)	160.4
Initial Water Content (%)	14.3
Total Density (pcf)	133.3
Dry Density (pcf)	116.6
G_s (assumed)	2.65
Degree of Saturation (%)	90.6
Void Ratio	0.42
Porosity	0.29
1 Pore Volume (cc)	47.3

Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
5	1.8E-08
20	6.3E-09
44	4.0E-09
68	2.0E-09
129	2.5E-09
174	2.3E-09
226	2.0E-09
277	2.1E-09
Average[1]:	2.2E-09



Note: A B-value of 0.98 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 05/01/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

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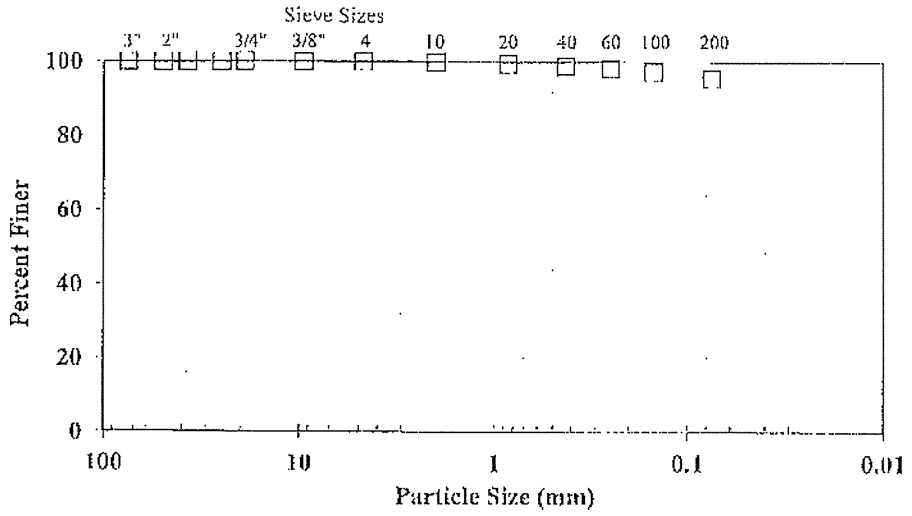
TRI/Environmental, Inc.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carol Corporation
Project: Turkey Creek Landfill
Sample: B11-1-65

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 04/26/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	99.9
No. 20 (850 µm)	99.5
No. 40 (425 µm)	98.9
No. 60 (250 µm)	98.3
No. 100 (150 µm)	97.4
No. 200 (75 µm)	95.6

Notes: Soil classifies as fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	56
Plastic Limit	23
Plastic Index	33
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 05/01/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

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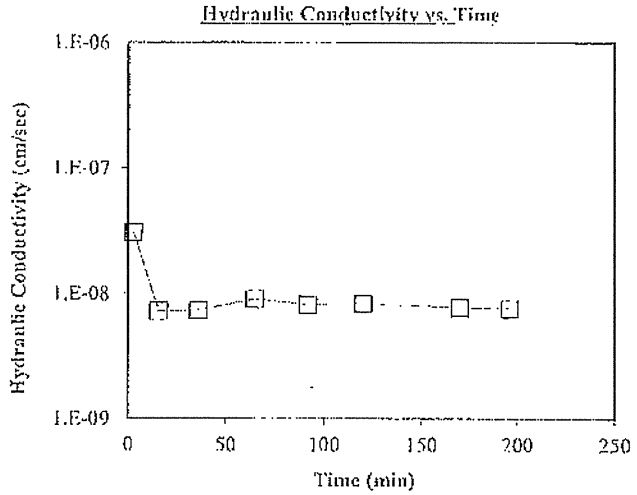
TRI/ENVIRONMENTAL, INC.
A Texas Research International Company

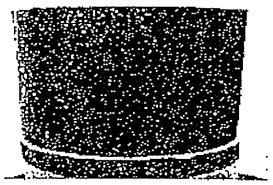
Hydraulic Conductivity

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B12-1-35

TRI Log#: E2365-22-02
Test Method: ASTM D 5084, Method F
Test Date: 05/01/12



INITIAL VALUES	
Avg. Sample Height (in)	1.56
Avg. Sample Diameter (in)	2.75
Wet Weight (g)	315.9
Area (in^2)	5.93
Volume (cc)	152.0
Initial Water Content (%)	18.5
Total Density (pcf)	129.7
Dry Density (pcf)	109.5
G_s (assumed)	2.65
Degree of Saturation (%)	96.1
Void Ratio	0.51
Porosity	0.34
1 Pore Volume (cc)	51.4



Hydraulic Conductivity

Time (min)	k at 20 deg C (cm/sec)
3	3.0E-08
16	7.2E-09
36	7.3E-09
65	9.0E-09
92	8.1E-09
120	8.3E-09
170	7.7E-09
196	7.6E-09
Average[1]:	7.9E-09

Note: A B-value of 0.99 was achieved for the undisturbed specimen. Permeation measurements were made with a mercury U-tube. The effective confining pressure was 20 psi per test request.

1: Average corrected hydraulic conductivity (k_{20}) is obtained from the last 4 average readings.

Cheng-Wei Chen, 05/01/12
Analysis & Quality Review/Date
Tested by: Chirag Rakholia

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

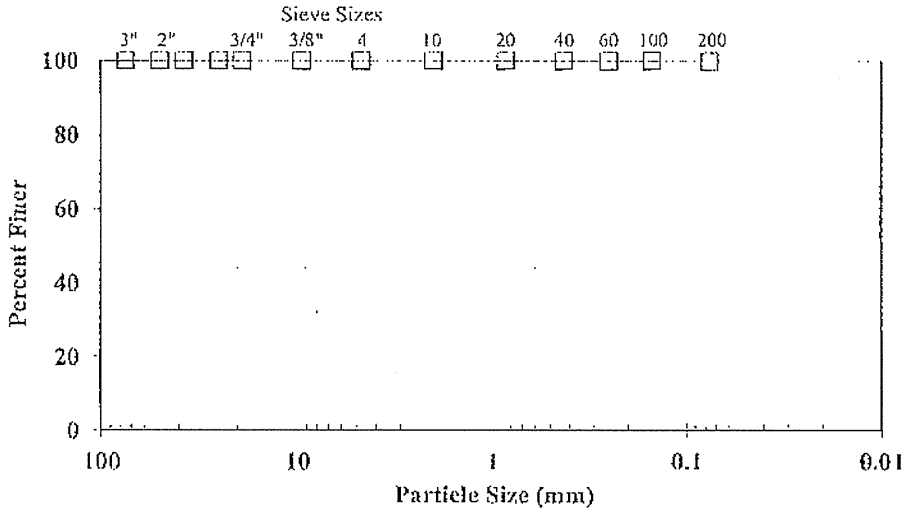
9063 Bee Caves Road Austin, TX 78733-6201 (512) 263-2101 | (512) 263-2558 1-800-880-TEST

TRI/Environmental, Inc.
A Texas Research International Company

Particle Size Analysis for Soils

Client: The Carel Corporation
Project: Turkey Creek Landfill
Sample: B12-1-35

TRI Log#: E2365-22-02
Test Method: ASTM D 422
Test Date: 04/26/12



Sieve Analysis	
Sieve Size	Percentage Passing (%)
3 in.	100.0
2 in.	100.0
1.5 in.	100.0
1 in.	100.0
3/4 in.	100.0
3/8 in.	100.0
No. 4 (4.75 mm)	100.0
No. 10 (2.00 mm)	100.0
No. 20 (850 µm)	100.0
No. 40 (425 µm)	100.0
No. 60 (250 µm)	100.0
No. 100 (150 µm)	100.0
No. 200 (75 µm)	99.8

Notes: Soil classifies as fat clay (CH) in accordance with ASTM D 2487.

Plastic Index (ASTM D 4318) Results	
Liquid Limit	61
Plastic Limit	21
Plastic Index	40
Notes: Specimen was air dried, 3 point Liquid Limit procedure was used.	

Cheng-Wei Chen, 04/30/12
Quality Review/Date
Tested by: Joe Vasquez & Tierra Jackson

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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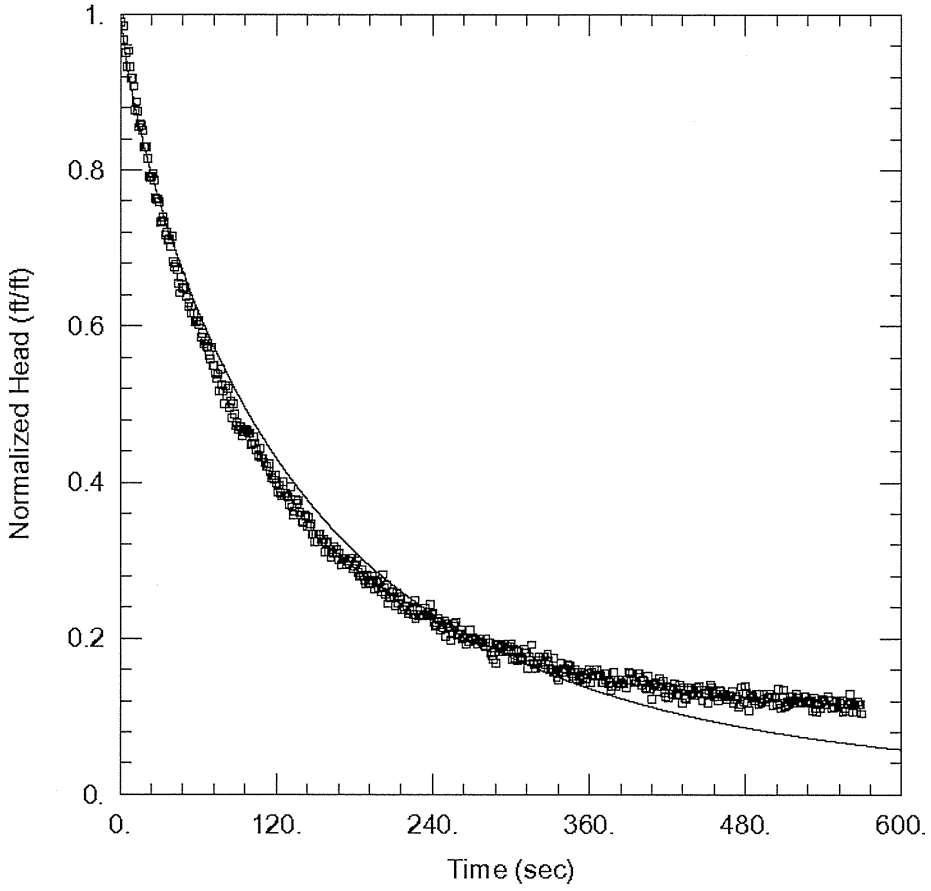
2021 SUBSURFACE INVESTIGATION SLUG TEST REPORTS BY WEAVER CONSULTANTS GROUP



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-1.aqt
Date: 11/29/21 Time: 18:36:01

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-1
Test Date: 11/16/21

AQUIFER DATA

Saturated Thickness: 7. ft

WELL DATA (PWCG-1)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 12.69 ft
Casing Radius: 0.25 ft
Static Water Column Height: 16.59 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model
Kr = 0.005399 cm/sec
Kz/Kr = 1.
Ss = 0.006139 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-1.aqt
Date: 11/29/21
Time: 18:36:11

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/16/21
Test Well: PWCG-1

AQUIFER DATA

Saturated Thickness: 7. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 16.59 ft
Casing Radius: 0.25 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 12.69 ft

No. of Observations: 569

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.646	286.	0.288
2.	1.637	287.	0.305
3.	1.608	288.	0.279
4.	1.579	289.	0.317
5.	1.55	290.	0.321
6.	1.584	291.	0.313
7.	1.55	292.	0.318
8.	1.525	293.	0.314
9.	1.525	294.	0.305
10.	1.508	295.	0.321
11.	1.458	296.	0.309
12.	1.475	297.	0.314
13.	1.454	298.	0.306
14.	1.421	299.	0.314
15.	1.429	300.	0.321
16.	1.425	301.	0.288
17.	1.413	302.	0.309
18.	1.379	303.	0.29
19.	1.379	304.	0.306
20.	1.379	305.	0.285
21.	1.355	306.	0.305

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	1.317	307.	0.293
23.	1.313	308.	0.288
24.	1.317	309.	0.289
25.	1.321	310.	0.309
26.	1.308	311.	0.302
27.	1.271	312.	0.302
28.	1.267	313.	0.268
29.	1.268	314.	0.293
30.	1.263	315.	0.284
31.	1.217	316.	0.319
32.	1.221	317.	0.281
33.	1.23	318.	0.276
34.	1.217	319.	0.269
35.	1.192	320.	0.28
36.	1.197	321.	0.285
37.	1.179	322.	0.294
38.	1.184	323.	0.272
39.	1.167	324.	0.281
40.	1.188	325.	0.294
41.	1.134	326.	0.293
42.	1.122	327.	0.277
43.	1.13	328.	0.299
44.	1.117	329.	0.285
45.	1.088	330.	0.268
46.	1.067	331.	0.267
47.	1.101	332.	0.26
48.	1.08	333.	0.29
49.	1.076	334.	0.265
50.	1.08	335.	0.251
51.	1.059	336.	0.243
52.	1.038	337.	0.264
53.	1.047	338.	0.281
54.	1.026	339.	0.261
55.	1.038	340.	0.269
56.	1.026	341.	0.268
57.	1.005	342.	0.265
58.	1.005	343.	0.277
59.	1.01	344.	0.274
60.	1.001	345.	0.273
61.	1.01	346.	0.257
62.	0.972	347.	0.248
63.	0.981	348.	0.253
64.	0.959	349.	0.265
65.	0.964	350.	0.248
66.	0.955	351.	0.262
67.	0.951	352.	0.252
68.	0.935	353.	0.245
69.	0.927	354.	0.262
70.	0.951	355.	0.251
71.	0.914	356.	0.256
72.	0.914	357.	0.24
73.	0.897	358.	0.248
74.	0.885	359.	0.257
75.	0.894	360.	0.265
76.	0.86	361.	0.239
77.	0.906	362.	0.262
78.	0.873	363.	0.252

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.86	364.	0.265
80.	0.831	365.	0.252
81.	0.869	366.	0.265
82.	0.848	367.	0.256
83.	0.864	368.	0.252
84.	0.823	369.	0.252
85.	0.836	370.	0.239
86.	0.802	371.	0.24
87.	0.831	372.	0.257
88.	0.811	373.	0.245
89.	0.786	374.	0.257
90.	0.79	375.	0.235
91.	0.778	376.	0.239
92.	0.782	377.	0.223
93.	0.782	378.	0.232
94.	0.765	379.	0.26
95.	0.773	380.	0.244
96.	0.773	381.	0.232
97.	0.778	382.	0.235
98.	0.774	383.	0.244
99.	0.77	384.	0.244
100.	0.77	385.	0.24
101.	0.745	386.	0.236
102.	0.748	387.	0.236
103.	0.761	388.	0.228
104.	0.749	389.	0.245
105.	0.733	390.	0.262
106.	0.724	391.	0.257
107.	0.719	392.	0.244
108.	0.737	393.	0.257
109.	0.716	394.	0.241
110.	0.716	395.	0.237
111.	0.707	396.	0.241
112.	0.699	397.	0.257
113.	0.699	398.	0.257
114.	0.704	399.	0.249
115.	0.687	400.	0.233
116.	0.674	401.	0.245
117.	0.679	402.	0.241
118.	0.67	403.	0.228
119.	0.679	404.	0.224
120.	0.662	405.	0.253
121.	0.645	406.	0.237
122.	0.658	407.	0.225
123.	0.641	408.	0.203
124.	0.637	409.	0.236
125.	0.667	410.	0.234
126.	0.637	411.	0.24
127.	0.641	412.	0.22
128.	0.637	413.	0.229
129.	0.633	414.	0.246
130.	0.616	415.	0.236
131.	0.655	416.	0.232
132.	0.613	417.	0.241
133.	0.596	418.	0.217
134.	0.604	419.	0.208
135.	0.629	420.	0.232

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
136.	0.621	421.	0.207
137.	0.625	422.	0.224
138.	0.601	423.	0.229
139.	0.596	424.	0.213
140.	0.58	425.	0.225
141.	0.579	426.	0.237
142.	0.596	427.	0.212
143.	0.592	428.	0.213
144.	0.571	429.	0.213
145.	0.589	430.	0.233
146.	0.571	431.	0.224
147.	0.575	432.	0.194
148.	0.555	433.	0.229
149.	0.555	434.	0.207
150.	0.538	435.	0.203
151.	0.554	436.	0.228
152.	0.538	437.	0.224
153.	0.555	438.	0.228
154.	0.555	439.	0.215
155.	0.543	440.	0.216
156.	0.538	441.	0.211
157.	0.543	442.	0.228
158.	0.517	443.	0.216
159.	0.535	444.	0.232
160.	0.538	445.	0.224
161.	0.517	446.	0.224
162.	0.505	447.	0.2
163.	0.522	448.	0.213
164.	0.514	449.	0.217
165.	0.526	450.	0.213
166.	0.523	451.	0.195
167.	0.522	452.	0.222
168.	0.501	453.	0.234
169.	0.514	454.	0.229
170.	0.489	455.	0.22
171.	0.502	456.	0.209
172.	0.502	457.	0.213
173.	0.502	458.	0.208
174.	0.489	459.	0.2
175.	0.498	460.	0.222
176.	0.49	461.	0.22
177.	0.502	462.	0.208
178.	0.502	463.	0.214
179.	0.481	464.	0.213
180.	0.486	465.	0.209
181.	0.49	466.	0.203
182.	0.498	467.	0.209
183.	0.473	468.	0.212
184.	0.465	469.	0.209
185.	0.468	470.	0.22
186.	0.478	471.	0.196
187.	0.465	472.	0.203
188.	0.456	473.	0.209
189.	0.448	474.	0.203
190.	0.469	475.	0.188
191.	0.452	476.	0.192
192.	0.448	477.	0.229

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
193.	0.448	478.	0.213
194.	0.465	479.	0.199
195.	0.456	480.	0.23
196.	0.436	481.	0.217
197.	0.453	482.	0.196
198.	0.452	483.	0.18
199.	0.441	484.	0.212
200.	0.453	485.	0.205
201.	0.432	486.	0.208
202.	0.469	487.	0.201
203.	0.44	488.	0.201
204.	0.427	489.	0.214
205.	0.445	490.	0.191
206.	0.406	491.	0.214
207.	0.42	492.	0.195
208.	0.419	493.	0.197
209.	0.433	494.	0.213
210.	0.432	495.	0.204
211.	0.42	496.	0.197
212.	0.403	497.	0.205
213.	0.429	498.	0.208
214.	0.407	499.	0.214
215.	0.42	500.	0.21
216.	0.415	501.	0.189
217.	0.394	502.	0.209
218.	0.394	503.	0.205
219.	0.399	504.	0.192
220.	0.403	505.	0.225
221.	0.387	506.	0.196
222.	0.391	507.	0.184
223.	0.394	508.	0.21
224.	0.399	509.	0.221
225.	0.383	510.	0.187
226.	0.412	511.	0.189
227.	0.374	512.	0.197
228.	0.395	513.	0.193
229.	0.379	514.	0.21
230.	0.392	515.	0.2
231.	0.383	516.	0.208
232.	0.379	517.	0.196
233.	0.383	518.	0.2
234.	0.396	519.	0.213
235.	0.383	520.	0.196
236.	0.383	521.	0.205
237.	0.379	522.	0.196
238.	0.404	523.	0.197
239.	0.384	524.	0.196
240.	0.387	525.	0.209
241.	0.367	526.	0.208
242.	0.359	527.	0.197
243.	0.362	528.	0.196
244.	0.375	529.	0.2
245.	0.371	530.	0.197
246.	0.35	531.	0.201
247.	0.362	532.	0.179
248.	0.354	533.	0.206
249.	0.371	534.	0.183

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
250.	0.337	535.	0.176
251.	0.363	536.	0.196
252.	0.359	537.	0.192
253.	0.354	538.	0.183
254.	0.329	539.	0.197
255.	0.341	540.	0.204
256.	0.363	541.	0.201
257.	0.358	542.	0.193
258.	0.366	543.	0.192
259.	0.338	544.	0.209
260.	0.342	545.	0.201
261.	0.342	546.	0.183
262.	0.35	547.	0.184
263.	0.33	548.	0.185
264.	0.334	549.	0.188
265.	0.334	550.	0.201
266.	0.321	551.	0.197
267.	0.334	552.	0.196
268.	0.325	553.	0.2
269.	0.351	554.	0.201
270.	0.33	555.	0.175
271.	0.334	556.	0.184
272.	0.33	557.	0.18
273.	0.329	558.	0.192
274.	0.321	559.	0.192
275.	0.321	560.	0.214
276.	0.33	561.	0.196
277.	0.326	562.	0.176
278.	0.322	563.	0.189
279.	0.317	564.	0.193
280.	0.314	565.	0.176
281.	0.33	566.	0.198
282.	0.322	567.	0.193
283.	0.322	568.	0.193
284.	0.301	569.	0.172
285.	0.297		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.005594	cm/sec
Ss	0.006139	ft^{-1}
Kz/Kr	1.	

T = K*b = 1.194 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	0.005399	7.329E-5	+/- 0.0001439	73.67	cm/sec
Ss	0.006139	0.0007498	+/- 0.001473	8.188	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 1.152 cm^2/sec

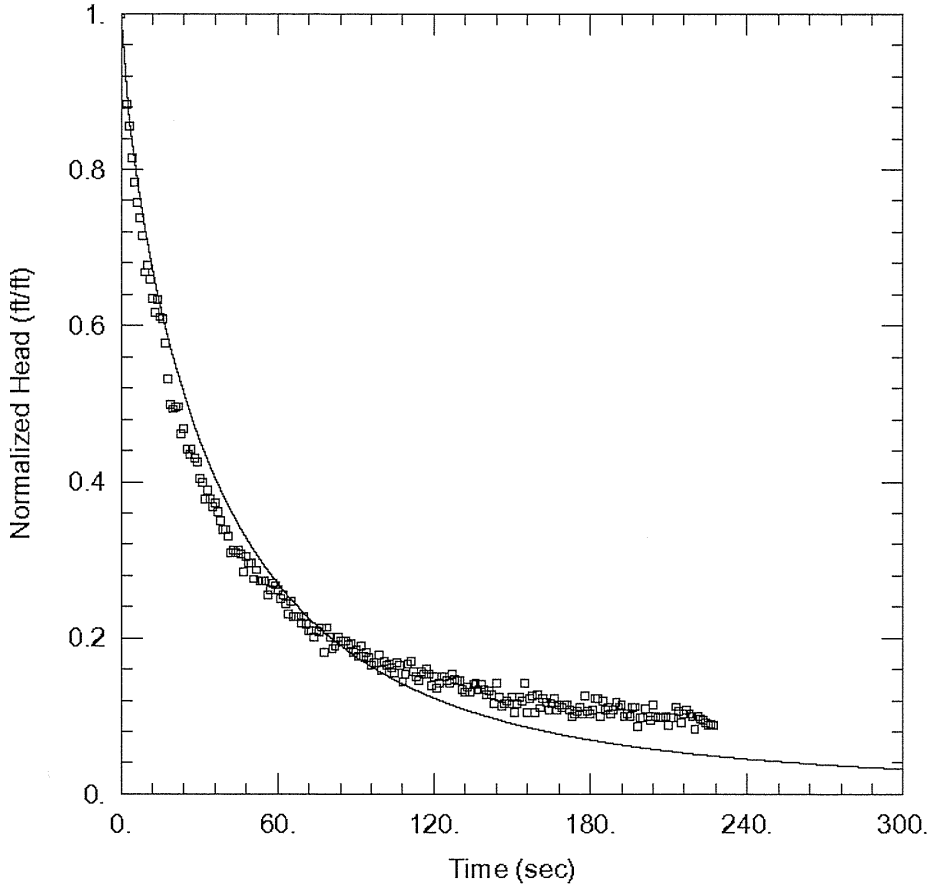
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.92
Ss	-0.92	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 1.218 ft^2
Variance ..... 0.002148 ft^2
Std. Deviation..... 0.04635 ft
Mean..... 0.01067 ft
No. of Residuals .. 569
No. of Estimates .. 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-2.aqt
Date: 11/29/21 Time: 18:34:27

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-2
Test Date: 11/16/21

AQUIFER DATA

Saturated Thickness: 13.5 ft

WELL DATA (PWCG-2)

Initial Displacement: 1.46 ft
Total Well Penetration Depth: 13.14 ft
Casing Radius: 0.25 ft
Static Water Column Height: 16.26 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model
Kr = 0.005684 cm/sec
Kz/Kr = 1.
Ss = 0.007407 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-2.aqt
Date: 11/29/21
Time: 18:35:01

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/16/21
Test Well: PWCG-2

AQUIFER DATA

Saturated Thickness: 13.5 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-2

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.46 ft
Static Water Column Height: 16.26 ft
Casing Radius: 0.25 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 13.14 ft

No. of Observations: 227

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.463	115.	0.228
2.	1.29	116.	0.224
3.	1.249	117.	0.233
4.	1.189	118.	0.224
5.	1.144	119.	0.203
6.	1.105	120.	0.219
7.	1.077	121.	0.198
8.	1.043	122.	0.207
9.	0.976	123.	0.219
10.	0.988	124.	0.219
11.	0.963	125.	0.212
12.	0.926	126.	0.207
13.	0.9	127.	0.224
14.	0.925	128.	0.215
15.	0.892	129.	0.211
16.	0.888	130.	0.211
17.	0.842	131.	0.195
18.	0.775	132.	0.191
19.	0.728	133.	0.199
20.	0.72	134.	0.191
21.	0.724	135.	0.204

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	0.725	136.	0.207
23.	0.674	137.	0.195
24.	0.683	138.	0.204
25.	0.645	139.	0.195
26.	0.636	140.	0.187
27.	0.645	141.	0.194
28.	0.628	142.	0.186
29.	0.62	143.	0.169
30.	0.59	144.	0.207
31.	0.582	145.	0.182
32.	0.552	146.	0.165
33.	0.569	147.	0.17
34.	0.552	148.	0.174
35.	0.536	149.	0.17
36.	0.545	150.	0.182
37.	0.528	151.	0.153
38.	0.51	152.	0.17
39.	0.494	153.	0.182
40.	0.494	154.	0.174
41.	0.482	155.	0.207
42.	0.452	156.	0.153
43.	0.456	157.	0.179
44.	0.452	158.	0.183
45.	0.456	159.	0.153
46.	0.448	160.	0.187
47.	0.415	161.	0.161
48.	0.444	162.	0.179
49.	0.431	163.	0.171
50.	0.431	164.	0.157
51.	0.402	165.	0.17
52.	0.419	166.	0.179
53.	0.398	167.	0.158
54.	0.398	168.	0.166
55.	0.398	169.	0.162
56.	0.373	170.	0.166
57.	0.381	171.	0.166
58.	0.394	172.	0.158
59.	0.39	173.	0.145
60.	0.381	174.	0.149
61.	0.365	175.	0.154
62.	0.373	176.	0.162
63.	0.356	177.	0.15
64.	0.336	178.	0.183
65.	0.361	179.	0.154
66.	0.331	180.	0.149
67.	0.331	181.	0.158
68.	0.331	182.	0.179
69.	0.319	183.	0.179
70.	0.332	184.	0.145
71.	0.318	185.	0.175
72.	0.306	186.	0.158
73.	0.306	187.	0.162
74.	0.294	188.	0.15
75.	0.306	189.	0.158
76.	0.302	190.	0.171
77.	0.311	191.	0.163
78.	0.264	192.	0.167

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.311	193.	0.145
80.	0.294	194.	0.149
81.	0.273	195.	0.145
82.	0.277	196.	0.162
83.	0.294	197.	0.163
84.	0.286	198.	0.125
85.	0.285	199.	0.142
86.	0.286	200.	0.142
87.	0.278	201.	0.159
88.	0.282	202.	0.145
89.	0.265	203.	0.137
90.	0.269	204.	0.167
91.	0.257	205.	0.146
92.	0.277	206.	0.142
93.	0.257	207.	0.142
94.	0.264	208.	0.142
95.	0.256	209.	0.146
96.	0.24	210.	0.129
97.	0.245	211.	0.142
98.	0.245	212.	0.142
99.	0.261	213.	0.163
100.	0.232	214.	0.154
101.	0.248	215.	0.134
102.	0.24	216.	0.15
103.	0.244	217.	0.158
104.	0.236	218.	0.15
105.	0.227	219.	0.146
106.	0.245	220.	0.121
107.	0.24	221.	0.146
108.	0.21	222.	0.141
109.	0.224	223.	0.137
110.	0.244	224.	0.134
111.	0.249	225.	0.129
112.	0.228	226.	0.13
113.	0.219	227.	0.129
114.	0.211		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.006487	cm/sec
Ss	0.007407	ft^{-1}
Kz/Kr	1.	

T = K*b = 2.669 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	0.005684	0.0002307	+/- 0.0004546	24.64	cm/sec
Ss	0.007407	0.00181	+/- 0.003568	4.092	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 2.339 cm^2/sec

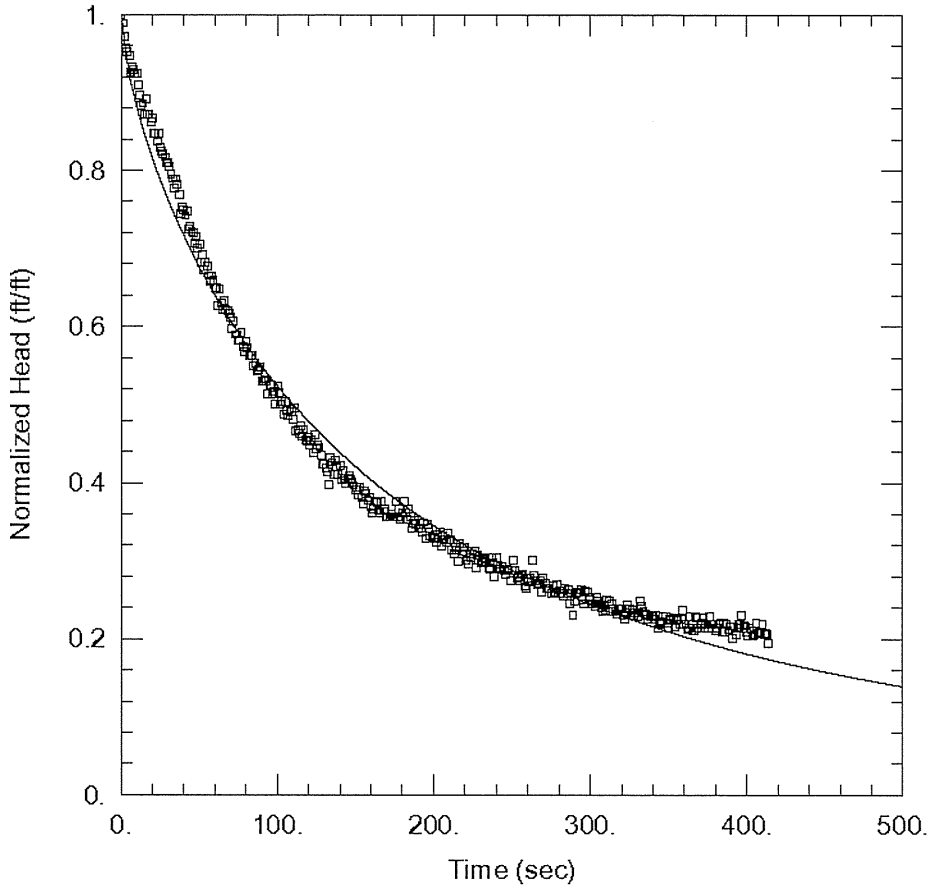
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.95
Ss	-0.95	1.00

Residual Statistics

for weighted residuals

Sum of Squares. . . 0.5712 ft^2
Variance . . . . . 0.002538 ft^2
Std. Deviation . . . . . 0.05038 ft
Mean . . . . . 0.01516 ft
No. of Residuals . . 227
No. of Estimates . . 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-3.aqt
Date: 11/29/21 Time: 18:23:48

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-3
Test Date: 11/16/21

AQUIFER DATA

Saturated Thickness: 19.84 ft

WELL DATA (PWCG-3)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 12.9 ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.74 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.000142 cm/sec
Kz/Kr = 1.
Ss = 0.001586 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-3.aqt
Date: 11/29/21
Time: 18:23:57

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/16/21
Test Well: PWCG-3

AQUIFER DATA

Saturated Thickness: 19.84 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-3

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 19.74 ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 12.9 ft

No. of Observations: 414

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.644	208.	0.539
2.	1.615	209.	0.556
3.	1.59	210.	0.543
4.	1.582	211.	0.543
5.	1.574	212.	0.522
6.	1.54	213.	0.513
7.	1.549	214.	0.526
8.	1.545	215.	0.522
9.	1.536	216.	0.497
10.	1.536	217.	0.535
11.	1.511	218.	0.514
12.	1.491	219.	0.518
13.	1.469	220.	0.527
14.	1.473	221.	0.501
15.	1.449	222.	0.493
16.	1.482	223.	0.513
17.	1.449	224.	0.506
18.	1.449	225.	0.514
19.	1.432	226.	0.519
20.	1.441	227.	0.485
21.	1.408	228.	0.51

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	1.408	229.	0.501
23.	1.391	230.	0.494
24.	1.408	231.	0.497
25.	1.378	232.	0.506
26.	1.37	233.	0.502
27.	1.366	234.	0.494
28.	1.358	235.	0.485
29.	1.345	236.	0.481
30.	1.345	237.	0.506
31.	1.338	238.	0.494
32.	1.321	239.	0.464
33.	1.312	240.	0.506
34.	1.291	241.	0.49
35.	1.312	242.	0.482
36.	1.3	243.	0.481
37.	1.279	244.	0.486
38.	1.237	245.	0.478
39.	1.25	246.	0.469
40.	1.246	247.	0.481
41.	1.233	248.	0.478
42.	1.242	249.	0.457
43.	1.204	250.	0.478
44.	1.209	251.	0.499
45.	1.2	252.	0.478
46.	1.196	253.	0.462
47.	1.175	254.	0.465
48.	1.188	255.	0.456
49.	1.163	256.	0.469
50.	1.171	257.	0.471
51.	1.134	258.	0.444
52.	1.151	259.	0.441
53.	1.117	260.	0.461
54.	1.134	261.	0.454
55.	1.126	262.	0.462
56.	1.105	263.	0.5
57.	1.093	264.	0.466
58.	1.105	265.	0.457
59.	1.096	266.	0.449
60.	1.08	267.	0.452
61.	1.079	268.	0.457
62.	1.042	269.	0.431
63.	1.076	270.	0.461
64.	1.046	271.	0.45
65.	1.034	272.	0.441
66.	1.051	273.	0.44
67.	1.034	274.	0.441
68.	1.03	275.	0.428
69.	1.026	276.	0.445
70.	1.018	277.	0.429
71.	0.993	278.	0.433
72.	1.009	279.	0.449
73.	0.98	280.	0.436
74.	0.98	281.	0.428
75.	0.968	282.	0.436
76.	0.967	283.	0.424
77.	0.985	284.	0.441
78.	0.955	285.	0.429

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.943	286.	0.438
80.	0.964	287.	0.408
81.	0.951	288.	0.429
82.	0.935	289.	0.382
83.	0.935	290.	0.412
84.	0.935	291.	0.429
85.	0.914	292.	0.433
86.	0.919	293.	0.433
87.	0.902	294.	0.438
88.	0.906	295.	0.416
89.	0.911	296.	0.408
90.	0.881	297.	0.434
91.	0.881	298.	0.433
92.	0.885	299.	0.416
93.	0.881	300.	0.42
94.	0.855	301.	0.408
95.	0.874	302.	0.408
96.	0.873	303.	0.401
97.	0.852	304.	0.422
98.	0.86	305.	0.413
99.	0.831	306.	0.408
100.	0.869	307.	0.4
101.	0.856	308.	0.392
102.	0.832	309.	0.405
103.	0.836	310.	0.395
104.	0.811	311.	0.417
105.	0.836	312.	0.413
106.	0.819	313.	0.392
107.	0.806	314.	0.408
108.	0.82	315.	0.396
109.	0.815	316.	0.392
110.	0.798	317.	0.387
111.	0.824	318.	0.396
112.	0.774	319.	0.396
113.	0.778	320.	0.396
114.	0.769	321.	0.383
115.	0.786	322.	0.376
116.	0.765	323.	0.389
117.	0.778	324.	0.404
118.	0.757	325.	0.397
119.	0.753	326.	0.383
120.	0.762	327.	0.393
121.	0.744	328.	0.383
122.	0.757	329.	0.389
123.	0.728	330.	0.379
124.	0.766	331.	0.388
125.	0.737	332.	0.413
126.	0.745	333.	0.401
127.	0.741	334.	0.392
128.	0.724	335.	0.387
129.	0.703	336.	0.384
130.	0.703	337.	0.375
131.	0.695	338.	0.38
132.	0.687	339.	0.384
133.	0.661	340.	0.38
134.	0.717	341.	0.375
135.	0.708	342.	0.384

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
136.	0.683	343.	0.354
137.	0.712	344.	0.367
138.	0.699	345.	0.363
139.	0.683	346.	0.371
140.	0.7	347.	0.38
141.	0.67	348.	0.38
142.	0.691	349.	0.367
143.	0.675	350.	0.355
144.	0.662	351.	0.375
145.	0.675	352.	0.373
146.	0.679	353.	0.377
147.	0.671	354.	0.359
148.	0.667	355.	0.373
149.	0.659	356.	0.375
150.	0.65	357.	0.364
151.	0.654	358.	0.376
152.	0.638	359.	0.393
153.	0.654	360.	0.364
154.	0.633	361.	0.364
155.	0.62	362.	0.352
156.	0.646	363.	0.356
157.	0.642	364.	0.38
158.	0.629	365.	0.351
159.	0.633	366.	0.35
160.	0.613	367.	0.381
161.	0.6	368.	0.377
162.	0.609	369.	0.356
163.	0.626	370.	0.364
164.	0.622	371.	0.368
165.	0.605	372.	0.377
166.	0.601	373.	0.356
167.	0.626	374.	0.364
168.	0.605	375.	0.355
169.	0.609	376.	0.38
170.	0.592	377.	0.364
171.	0.593	378.	0.364
172.	0.592	379.	0.364
173.	0.597	380.	0.351
174.	0.592	381.	0.355
175.	0.592	382.	0.364
176.	0.625	383.	0.368
177.	0.591	384.	0.347
178.	0.608	385.	0.368
179.	0.588	386.	0.347
180.	0.6	387.	0.364
181.	0.626	388.	0.352
182.	0.601	389.	0.36
183.	0.588	390.	0.36
184.	0.609	391.	0.335
185.	0.592	392.	0.36
186.	0.567	393.	0.343
187.	0.579	394.	0.355
188.	0.584	395.	0.364
189.	0.576	396.	0.365
190.	0.567	397.	0.382
191.	0.58	398.	0.361
192.	0.567	399.	0.36

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
193.	0.559	400.	0.347
194.	0.58	401.	0.339
195.	0.546	402.	0.357
196.	0.576	403.	0.352
197.	0.568	404.	0.339
198.	0.551	405.	0.343
199.	0.55	406.	0.368
200.	0.546	407.	0.344
201.	0.555	408.	0.348
202.	0.538	409.	0.347
203.	0.548	410.	0.365
204.	0.559	411.	0.343
205.	0.531	412.	0.345
206.	0.551	413.	0.343
207.	0.543	414.	0.324

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.0001438	cm/sec
Ss	0.001586	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.08694 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	0.000142	2.846E-6	+/- 5.595E-6	49.92	cm/sec
Ss	0.001586	0.000151	+/- 0.0002969	10.5	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.0859 cm^2/sec

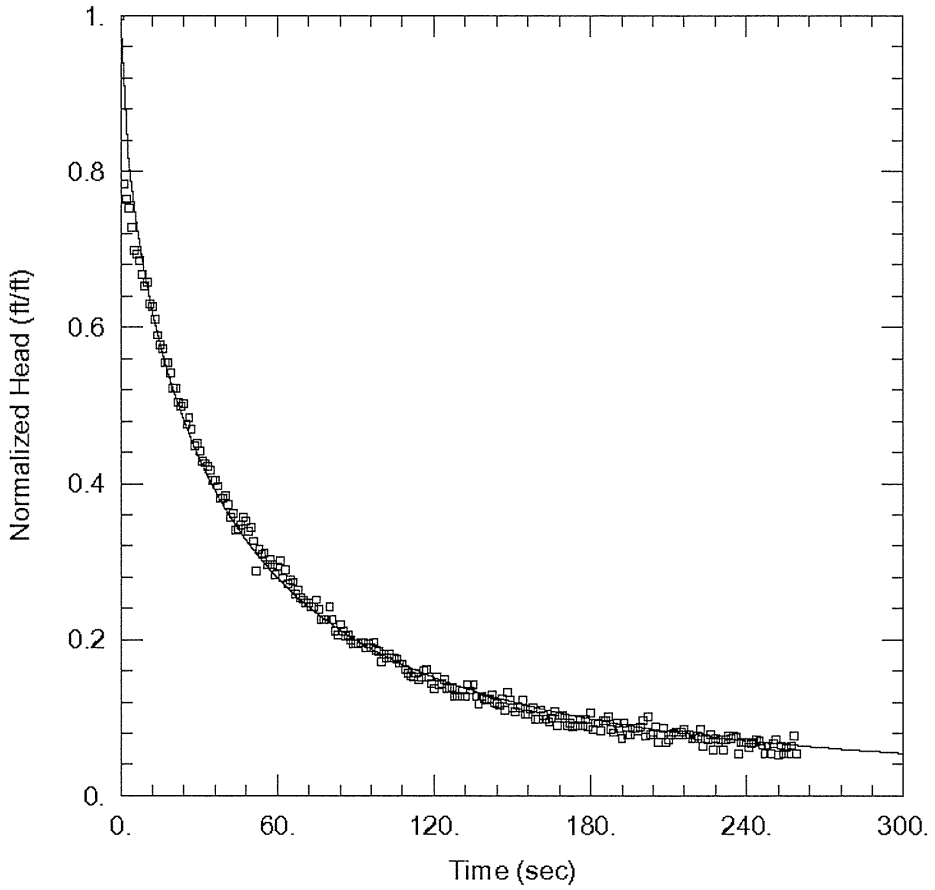
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.97
Ss	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 0.5339 ft^2
Variance ..... 0.001296 ft^2
Std. Deviation..... 0.036 ft
Mean..... 0.005157 ft
No. of Residuals .. 414
No. of Estimates .. 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-4.aqt
Date: 11/29/21 Time: 18:22:21

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-4
Test Date: 11/16/21

AQUIFER DATA

Saturated Thickness: 11. ft

WELL DATA (PWCG-4)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 10.39 ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.81 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.0004159 cm/sec
Kz/Kr = 1.
Ss = 0.008872 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-4.aqt
Date: 11/29/21
Time: 18:22:31

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/16/21
Test Well: PWCG-4

AQUIFER DATA

Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-4

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 13.81 ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10.39 ft

No. of Observations: 259

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.302	131.	0.224
2.	1.269	132.	0.212
3.	1.252	133.	0.236
4.	1.21	134.	0.224
5.	1.16	135.	0.236
6.	1.152	136.	0.212
7.	1.139	137.	0.195
8.	1.11	138.	0.211
9.	1.084	139.	0.207
10.	1.093	140.	0.203
11.	1.047	141.	0.207
12.	1.042	142.	0.216
13.	1.014	143.	0.199
14.	0.98	144.	0.195
15.	0.959	145.	0.191
16.	0.951	146.	0.207
17.	0.922	147.	0.182
18.	0.922	148.	0.22
19.	0.901	149.	0.203
20.	0.867	150.	0.187
21.	0.867	151.	0.179

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	0.838	152.	0.191
23.	0.829	153.	0.187
24.	0.834	154.	0.204
25.	0.792	155.	0.174
26.	0.805	156.	0.174
27.	0.78	157.	0.183
28.	0.746	158.	0.187
29.	0.75	159.	0.162
30.	0.733	160.	0.162
31.	0.713	161.	0.183
32.	0.708	162.	0.171
33.	0.7	163.	0.162
34.	0.692	164.	0.158
35.	0.671	165.	0.166
36.	0.671	166.	0.179
37.	0.659	167.	0.15
38.	0.634	168.	0.171
39.	0.634	169.	0.17
40.	0.638	170.	0.166
41.	0.621	171.	0.15
42.	0.592	172.	0.154
43.	0.6	173.	0.146
44.	0.566	174.	0.15
45.	0.567	175.	0.15
46.	0.575	176.	0.162
47.	0.592	177.	0.15
48.	0.584	178.	0.163
49.	0.563	179.	0.146
50.	0.571	180.	0.176
51.	0.542	181.	0.141
52.	0.479	182.	0.155
53.	0.525	183.	0.154
54.	0.513	184.	0.138
55.	0.517	185.	0.159
56.	0.492	186.	0.159
57.	0.504	187.	0.167
58.	0.492	188.	0.142
59.	0.471	189.	0.134
60.	0.488	190.	0.155
61.	0.501	191.	0.143
62.	0.463	192.	0.122
63.	0.48	193.	0.155
64.	0.45	194.	0.13
65.	0.459	195.	0.13
66.	0.455	196.	0.143
67.	0.429	197.	0.143
68.	0.438	198.	0.139
69.	0.422	199.	0.147
70.	0.417	200.	0.159
71.	0.409	201.	0.126
72.	0.409	202.	0.168
73.	0.401	203.	0.13
74.	0.401	204.	0.134
75.	0.417	205.	0.147
76.	0.397	206.	0.114
77.	0.376	207.	0.131
78.	0.376	208.	0.143

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.376	209.	0.113
80.	0.401	210.	0.118
81.	0.376	211.	0.13
82.	0.351	212.	0.134
83.	0.342	213.	0.135
84.	0.364	214.	0.131
85.	0.351	215.	0.135
86.	0.338	216.	0.14
87.	0.342	217.	0.131
88.	0.33	218.	0.131
89.	0.322	219.	0.123
90.	0.322	220.	0.123
91.	0.323	221.	0.127
92.	0.326	222.	0.14
93.	0.326	223.	0.105
94.	0.314	224.	0.123
95.	0.323	225.	0.119
96.	0.314	226.	0.131
97.	0.327	227.	0.098
98.	0.31	228.	0.122
99.	0.306	229.	0.114
100.	0.285	230.	0.119
101.	0.302	231.	0.098
102.	0.293	232.	0.119
103.	0.302	233.	0.127
104.	0.294	234.	0.123
105.	0.294	235.	0.127
106.	0.29	236.	0.126
107.	0.281	237.	0.09
108.	0.281	238.	0.114
109.	0.269	239.	0.114
110.	0.26	240.	0.114
111.	0.256	241.	0.102
112.	0.252	242.	0.111
113.	0.261	243.	0.115
114.	0.248	244.	0.119
115.	0.252	245.	0.116
116.	0.265	246.	0.107
117.	0.269	247.	0.089
118.	0.252	248.	0.107
119.	0.24	249.	0.09
120.	0.227	250.	0.111
121.	0.252	251.	0.12
122.	0.236	252.	0.086
123.	0.24	253.	0.107
124.	0.248	254.	0.09
125.	0.228	255.	0.103
126.	0.228	256.	0.09
127.	0.232	257.	0.107
128.	0.21	258.	0.128
129.	0.211	259.	0.09
130.	0.211		

SOLUTION

Slug Test
Aquifer Model: Confined

Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.0004104	cm/sec
Ss	0.009091	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.1376 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	0.0004159	7.436E-6	+/- 1.464E-5	55.93	cm/sec
Ss	0.008872	0.0005491	+/- 0.001081	16.16	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.1394 cm^2/sec

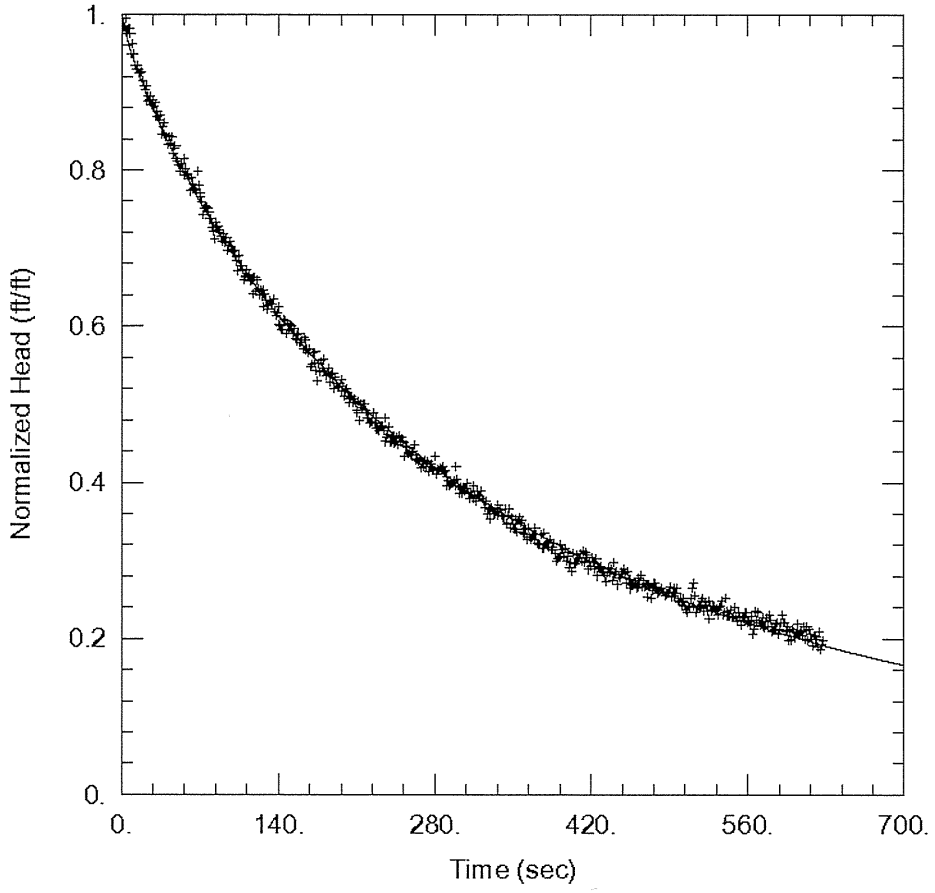
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.95
Ss	-0.95	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 0.1459 ft^2
Variance ..... 0.0005678 ft^2
Std. Deviation..... 0.02383 ft
Mean..... -0.003628 ft
No. of Residuals .. 259
No. of Estimates .. 2



RISING HEAD TEST

Data Set: D:\...\PWCG-9.aqt
Date: 11/29/21 Time: 18:21:01

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-9
Test Date: 11/16/21

AQUIFER DATA

Saturated Thickness: 12.56 ft

WELL DATA (PWCG-9)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 10.39 ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.95 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.0001196 cm/sec
Kz/Kr = 1.
Ss = 0.0001094 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-9.aqt
Title: Rising Head Test
Date: 11/29/21
Time: 18:21:11

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/16/21
Test Well: PWCG-9

AQUIFER DATA

Saturated Thickness: 12.56 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-9

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 12.95 ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 10.39 ft

No. of Observations: 627

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.662	315.	0.632
2.	1.636	316.	0.638
3.	1.634	317.	0.625
4.	1.654	318.	0.647
5.	1.621	319.	0.636
6.	1.632	320.	0.636
7.	1.632	321.	0.647
8.	1.621	322.	0.632
9.	1.577	323.	0.632
10.	1.598	324.	0.625
11.	1.577	325.	0.612
12.	1.554	326.	0.625
13.	1.546	327.	0.599
14.	1.554	328.	0.609
15.	1.546	329.	0.587
16.	1.536	330.	0.61
17.	1.536	331.	0.612
18.	1.54	332.	0.606
19.	1.521	333.	0.599
20.	1.51	334.	0.599

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
21.	1.502	335.	0.605
22.	1.51	336.	0.595
23.	1.476	337.	0.617
24.	1.488	338.	0.605
25.	1.48	339.	0.61
26.	1.488	340.	0.595
27.	1.469	341.	0.591
28.	1.48	342.	0.591
29.	1.466	343.	0.61
30.	1.473	344.	0.575
31.	1.443	345.	0.58
32.	1.454	346.	0.595
33.	1.443	347.	0.61
34.	1.436	348.	0.569
35.	1.447	349.	0.591
36.	1.406	350.	0.576
37.	1.421	351.	0.565
38.	1.43	352.	0.587
39.	1.406	353.	0.565
40.	1.402	354.	0.561
41.	1.402	355.	0.584
42.	1.384	356.	0.591
43.	1.402	357.	0.58
44.	1.388	358.	0.584
45.	1.4	359.	0.558
46.	1.365	360.	0.554
47.	1.377	361.	0.569
48.	1.381	362.	0.565
49.	1.354	363.	0.543
50.	1.348	364.	0.569
51.	1.34	365.	0.55
52.	1.328	366.	0.543
53.	1.343	367.	0.55
54.	1.332	368.	0.554
55.	1.354	369.	0.543
56.	1.318	370.	0.569
57.	1.333	371.	0.554
58.	1.318	372.	0.535
59.	1.322	373.	0.532
60.	1.311	374.	0.532
61.	1.285	375.	0.554
62.	1.314	376.	0.524
63.	1.299	377.	0.524
64.	1.288	378.	0.558
65.	1.288	379.	0.532
66.	1.288	380.	0.535
67.	1.285	381.	0.539
68.	1.327	382.	0.528
69.	1.297	383.	0.543
70.	1.281	384.	0.521
71.	1.273	385.	0.528
72.	1.262	386.	0.521
73.	1.236	387.	0.535
74.	1.248	388.	0.513
75.	1.255	389.	0.498
76.	1.252	390.	0.502
77.	1.247	391.	0.506

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
78.	1.24	392.	0.509
79.	1.225	393.	0.532
80.	1.225	394.	0.521
81.	1.208	395.	0.521
82.	1.199	396.	0.506
83.	1.184	397.	0.524
84.	1.219	398.	0.498
85.	1.208	399.	0.517
86.	1.211	400.	0.509
87.	1.203	401.	0.483
88.	1.196	402.	0.496
89.	1.189	403.	0.476
90.	1.178	404.	0.513
91.	1.193	405.	0.495
92.	1.174	406.	0.491
93.	1.178	407.	0.51
94.	1.185	408.	0.498
95.	1.159	409.	0.503
96.	1.17	410.	0.506
97.	1.178	411.	0.513
98.	1.167	412.	0.498
99.	1.155	413.	0.518
100.	1.159	414.	0.495
101.	1.159	415.	0.517
102.	1.144	416.	0.51
103.	1.137	417.	0.506
104.	1.115	418.	0.48
105.	1.148	419.	0.498
106.	1.126	420.	0.487
107.	1.126	421.	0.506
108.	1.118	422.	0.498
109.	1.096	423.	0.495
110.	1.101	424.	0.481
111.	1.103	425.	0.503
112.	1.118	426.	0.466
113.	1.1	427.	0.487
114.	1.107	428.	0.483
115.	1.092	429.	0.487
116.	1.096	430.	0.476
117.	1.066	431.	0.473
118.	1.1	432.	0.477
119.	1.1	433.	0.466
120.	1.071	434.	0.454
121.	1.096	435.	0.473
122.	1.077	436.	0.484
123.	1.064	437.	0.473
124.	1.074	438.	0.48
125.	1.063	439.	0.457
126.	1.04	440.	0.496
127.	1.075	441.	0.469
128.	1.066	442.	0.47
129.	1.052	443.	0.477
130.	1.034	444.	0.447
131.	1.041	445.	0.469
132.	1.052	446.	0.462
133.	1.045	447.	0.476
134.	1.045	448.	0.47

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
135.	1.044	449.	0.47
136.	1.056	450.	0.481
137.	1.029	451.	0.473
138.	1.019	452.	0.45
139.	1.026	453.	0.477
140.	1.038	454.	0.458
141.	1.	455.	0.458
142.	0.997	456.	0.439
143.	0.989	457.	0.447
144.	0.989	458.	0.446
145.	1.012	459.	0.455
146.	1.008	460.	0.45
147.	0.982	461.	0.44
148.	0.997	462.	0.444
149.	1.004	463.	0.462
150.	0.989	464.	0.455
151.	1.	465.	0.466
152.	0.997	466.	0.444
153.	0.982	467.	0.455
154.	0.993	468.	0.444
155.	0.971	469.	0.447
156.	0.978	470.	0.421
157.	0.967	471.	0.446
158.	0.983	472.	0.447
159.	0.963	473.	0.442
160.	0.963	474.	0.418
161.	0.967	475.	0.435
162.	0.948	476.	0.451
163.	0.972	477.	0.45
164.	0.967	478.	0.44
165.	0.946	479.	0.442
166.	0.948	480.	0.429
167.	0.941	481.	0.432
168.	0.948	482.	0.436
169.	0.911	483.	0.44
170.	0.916	484.	0.432
171.	0.941	485.	0.432
172.	0.92	486.	0.425
173.	0.942	487.	0.425
174.	0.904	488.	0.428
175.	0.881	489.	0.429
176.	0.92	490.	0.432
177.	0.9	491.	0.442
178.	0.923	492.	0.421
179.	0.908	493.	0.432
180.	0.926	494.	0.425
181.	0.904	495.	0.44
182.	0.901	496.	0.429
183.	0.893	497.	0.44
184.	0.9	498.	0.414
185.	0.909	499.	0.41
186.	0.878	500.	0.418
187.	0.894	501.	0.406
188.	0.889	502.	0.414
189.	0.897	503.	0.418
190.	0.864	504.	0.403
191.	0.89	505.	0.395

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
192.	0.875	506.	0.388
193.	0.87	507.	0.403
194.	0.868	508.	0.399
195.	0.875	509.	0.418
196.	0.883	510.	0.44
197.	0.86	511.	0.451
198.	0.871	512.	0.403
199.	0.849	513.	0.425
200.	0.86	514.	0.388
201.	0.864	515.	0.398
202.	0.857	516.	0.403
203.	0.842	517.	0.403
204.	0.834	518.	0.414
205.	0.845	519.	0.399
206.	0.849	520.	0.418
207.	0.834	521.	0.392
208.	0.842	522.	0.41
209.	0.834	523.	0.406
210.	0.819	524.	0.392
211.	0.812	525.	0.414
212.	0.838	526.	0.376
213.	0.797	527.	0.403
214.	0.831	528.	0.392
215.	0.823	529.	0.402
216.	0.831	530.	0.403
217.	0.831	531.	0.392
218.	0.817	532.	0.398
219.	0.812	533.	0.395
220.	0.802	534.	0.384
221.	0.802	535.	0.399
222.	0.791	536.	0.403
223.	0.793	537.	0.414
224.	0.793	538.	0.384
225.	0.812	539.	0.388
226.	0.79	540.	0.418
227.	0.779	541.	0.392
228.	0.802	542.	0.38
229.	0.779	543.	0.38
230.	0.775	544.	0.38
231.	0.786	545.	0.395
232.	0.786	546.	0.377
233.	0.786	547.	0.38
234.	0.776	548.	0.399
235.	0.801	549.	0.377
236.	0.752	550.	0.38
237.	0.761	551.	0.369
238.	0.768	552.	0.388
239.	0.782	553.	0.38
240.	0.75	554.	0.362
241.	0.75	555.	0.38
242.	0.765	556.	0.377
243.	0.749	557.	0.373
244.	0.765	558.	0.388
245.	0.752	559.	0.388
246.	0.761	560.	0.366
247.	0.746	561.	0.369
248.	0.764	562.	0.364

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
249.	0.75	563.	0.38
250.	0.76	564.	0.343
251.	0.754	565.	0.352
252.	0.75	566.	0.362
253.	0.72	567.	0.392
254.	0.741	568.	0.373
255.	0.739	569.	0.388
256.	0.726	570.	0.367
257.	0.728	571.	0.362
258.	0.724	572.	0.366
259.	0.731	573.	0.377
260.	0.724	574.	0.358
261.	0.731	575.	0.356
262.	0.746	576.	0.369
263.	0.713	577.	0.377
264.	0.716	578.	0.359
265.	0.709	579.	0.384
266.	0.716	580.	0.373
267.	0.713	581.	0.348
268.	0.697	582.	0.358
269.	0.709	583.	0.351
270.	0.698	584.	0.354
271.	0.713	585.	0.363
272.	0.698	586.	0.366
273.	0.709	587.	0.343
274.	0.709	588.	0.354
275.	0.687	589.	0.351
276.	0.698	590.	0.366
277.	0.705	591.	0.384
278.	0.694	592.	0.367
279.	0.69	593.	0.366
280.	0.72	594.	0.347
281.	0.683	595.	0.351
282.	0.683	596.	0.358
283.	0.694	597.	0.328
284.	0.69	598.	0.352
285.	0.695	599.	0.33
286.	0.694	600.	0.354
287.	0.698	601.	0.347
288.	0.687	602.	0.336
289.	0.69	603.	0.344
290.	0.676	604.	0.344
291.	0.657	605.	0.363
292.	0.669	606.	0.343
293.	0.657	607.	0.344
294.	0.661	608.	0.347
295.	0.664	609.	0.34
296.	0.664	610.	0.358
297.	0.668	611.	0.332
298.	0.657	612.	0.351
299.	0.698	613.	0.359
300.	0.672	614.	0.328
301.	0.658	615.	0.352
302.	0.642	616.	0.343
303.	0.654	617.	0.332
304.	0.642	618.	0.318
305.	0.653	619.	0.34

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
306.	0.647	620.	0.33
307.	0.653	621.	0.337
308.	0.653	622.	0.332
309.	0.662	623.	0.314
310.	0.642	624.	0.347
311.	0.632	625.	0.31
312.	0.643	626.	0.321
313.	0.639	627.	0.328
314.	0.657		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.0001196	cm/sec
Ss	0.0001094	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.04577 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	0.0001196	9.626E-7	+/- 1.891E-6	124.2	cm/sec
Ss	0.0001094	7.125E-6	+/- 1.399E-5	15.36	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.04577 cm^2/sec

Parameter Correlations

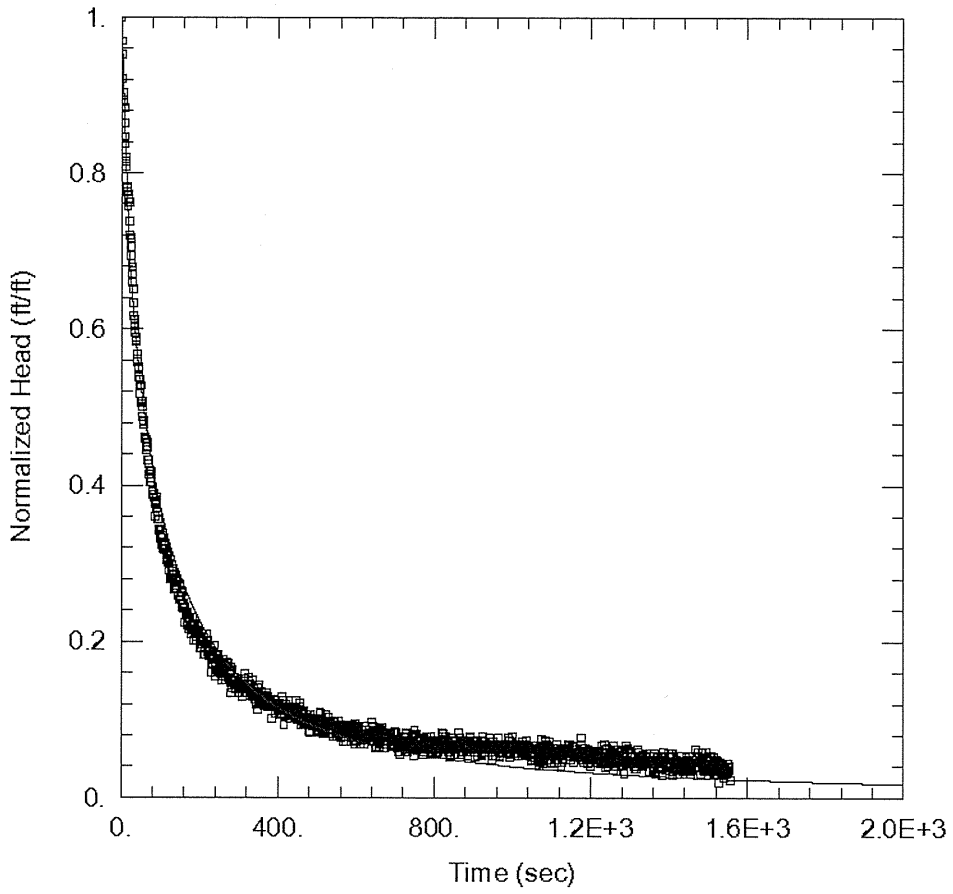
	Kr	Ss
Kr	1.00	-0.99
Ss	-0.99	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 0.1197 ft^2
Variance ..... 0.0001916 ft^2
Std. Deviation..... 0.01384 ft
Mean..... 0.001134 ft
No. of Residuals .. 627

No. of Estimates . . 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-10.aqt
Date: 11/29/21 Time: 18:20:26

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-10
Test Date: 11/17/21

AQUIFER DATA

Saturated Thickness: 19.5 ft

WELL DATA (PWCG-10)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 21.68 ft
Casing Radius: 0.083 ft
Static Water Column Height: 23. ft
Screen Length: 20. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 9.972E-5 cm/sec
Kz/Kr = 1.
Ss = 0.005128 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-10.aqt
Date: 11/29/21
Time: 18:20:18

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/17/21
Test Well: PWCG-10

AQUIFER DATA

Saturated Thickness: 19.5 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-10

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 23. ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 20. ft
Total Well Penetration Depth: 21.68 ft

No. of Observations: 1556

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.611	779.	0.118
2.	1.582	780.	0.102
3.	1.532	781.	0.122
4.	1.502	782.	0.131
5.	1.485	783.	0.114
6.	1.481	784.	0.122
7.	1.469	785.	0.102
8.	1.435	786.	0.101
9.	1.393	787.	0.119
10.	1.406	788.	0.101
11.	1.364	789.	0.119
12.	1.355	790.	0.13
13.	1.343	791.	0.094
14.	1.297	792.	0.109
15.	1.288	793.	0.102
16.	1.301	794.	0.097
17.	1.259	795.	0.092
18.	1.284	796.	0.115
19.	1.276	797.	0.097
20.	1.267	798.	0.106
21.	1.225	799.	0.109

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	1.196	800.	0.11
23.	1.192	801.	0.102
24.	1.171	802.	0.122
25.	1.154	803.	0.113
26.	1.137	804.	0.106
27.	1.129	805.	0.094
28.	1.116	806.	0.118
29.	1.095	807.	0.114
30.	1.083	808.	0.094
31.	1.053	809.	0.114
32.	1.024	810.	0.105
33.	1.008	811.	0.098
34.	1.016	812.	0.114
35.	1.003	813.	0.109
36.	0.99	814.	0.119
37.	0.97	815.	0.11
38.	0.978	816.	0.113
39.	0.974	817.	0.122
40.	0.944	818.	0.123
41.	0.932	819.	0.105
42.	0.928	820.	0.139
43.	0.914	821.	0.131
44.	0.915	822.	0.126
45.	0.895	823.	0.136
46.	0.89	824.	0.119
47.	0.877	825.	0.122
48.	0.86	826.	0.122
49.	0.877	827.	0.101
50.	0.877	828.	0.114
51.	0.843	829.	0.13
52.	0.839	830.	0.113
53.	0.831	831.	0.122
54.	0.844	832.	0.102
55.	0.81	833.	0.106
56.	0.798	834.	0.118
57.	0.802	835.	0.118
58.	0.801	836.	0.098
59.	0.794	837.	0.106
60.	0.764	838.	0.106
61.	0.768	839.	0.092
62.	0.768	840.	0.085
63.	0.747	841.	0.115
64.	0.761	842.	0.089
65.	0.739	843.	0.109
66.	0.744	844.	0.115
67.	0.718	845.	0.106
68.	0.756	846.	0.101
69.	0.718	847.	0.109
70.	0.71	848.	0.127
71.	0.688	849.	0.127
72.	0.693	850.	0.106
73.	0.672	851.	0.123
74.	0.697	852.	0.11
75.	0.697	853.	0.092
76.	0.68	854.	0.11
77.	0.693	855.	0.105
78.	0.672	856.	0.119

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.651	857.	0.106
80.	0.651	858.	0.11
81.	0.652	859.	0.105
82.	0.643	860.	0.106
83.	0.638	861.	0.115
84.	0.643	862.	0.106
85.	0.643	863.	0.139
86.	0.63	864.	0.113
87.	0.626	865.	0.127
88.	0.597	866.	0.106
89.	0.639	867.	0.107
90.	0.618	868.	0.115
91.	0.627	869.	0.106
92.	0.593	870.	0.092
93.	0.592	871.	0.115
94.	0.606	872.	0.123
95.	0.568	873.	0.097
96.	0.571	874.	0.11
97.	0.567	875.	0.098
98.	0.592	876.	0.106
99.	0.572	877.	0.118
100.	0.559	878.	0.106
101.	0.551	879.	0.122
102.	0.568	880.	0.118
103.	0.551	881.	0.119
104.	0.538	882.	0.097
105.	0.542	883.	0.118
106.	0.556	884.	0.11
107.	0.53	885.	0.089
108.	0.53	886.	0.109
109.	0.539	887.	0.11
110.	0.526	888.	0.118
111.	0.535	889.	0.118
112.	0.53	890.	0.105
113.	0.538	891.	0.102
114.	0.53	892.	0.11
115.	0.505	893.	0.131
116.	0.517	894.	0.127
117.	0.517	895.	0.11
118.	0.509	896.	0.101
119.	0.518	897.	0.109
120.	0.521	898.	0.106
121.	0.501	899.	0.123
122.	0.496	900.	0.106
123.	0.484	901.	0.114
124.	0.484	902.	0.097
125.	0.497	903.	0.118
126.	0.467	904.	0.118
127.	0.464	905.	0.086
128.	0.467	906.	0.097
129.	0.467	907.	0.105
130.	0.488	908.	0.118
131.	0.472	909.	0.119
132.	0.481	910.	0.102
133.	0.467	911.	0.101
134.	0.463	912.	0.102
135.	0.455	913.	0.089

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
136.	0.476	914.	0.113
137.	0.443	915.	0.106
138.	0.463	916.	0.106
139.	0.446	917.	0.113
140.	0.455	918.	0.101
141.	0.446	919.	0.11
142.	0.442	920.	0.123
143.	0.455	921.	0.093
144.	0.451	922.	0.088
145.	0.429	923.	0.092
146.	0.429	924.	0.115
147.	0.429	925.	0.131
148.	0.455	926.	0.103
149.	0.422	927.	0.098
150.	0.421	928.	0.11
151.	0.426	929.	0.115
152.	0.434	930.	0.119
153.	0.43	931.	0.102
154.	0.421	932.	0.118
155.	0.413	933.	0.115
156.	0.438	934.	0.102
157.	0.405	935.	0.11
158.	0.414	936.	0.101
159.	0.409	937.	0.113
160.	0.401	938.	0.114
161.	0.372	939.	0.11
162.	0.401	940.	0.127
163.	0.405	941.	0.11
164.	0.397	942.	0.11
165.	0.392	943.	0.106
166.	0.389	944.	0.106
167.	0.384	945.	0.101
168.	0.393	946.	0.106
169.	0.368	947.	0.105
170.	0.389	948.	0.115
171.	0.384	949.	0.081
172.	0.359	950.	0.089
173.	0.38	951.	0.119
174.	0.38	952.	0.11
175.	0.364	953.	0.106
176.	0.372	954.	0.114
177.	0.38	955.	0.115
178.	0.367	956.	0.113
179.	0.347	957.	0.109
180.	0.368	958.	0.089
181.	0.384	959.	0.106
182.	0.364	960.	0.11
183.	0.355	961.	0.106
184.	0.335	962.	0.101
185.	0.355	963.	0.127
186.	0.371	964.	0.098
187.	0.368	965.	0.115
188.	0.359	966.	0.089
189.	0.347	967.	0.102
190.	0.342	968.	0.085
191.	0.335	969.	0.102
192.	0.347	970.	0.106

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
193.	0.347	971.	0.113
194.	0.354	972.	0.109
195.	0.347	973.	0.097
196.	0.347	974.	0.098
197.	0.351	975.	0.094
198.	0.347	976.	0.098
199.	0.356	977.	0.102
200.	0.318	978.	0.098
201.	0.33	979.	0.11
202.	0.338	980.	0.102
203.	0.342	981.	0.101
204.	0.317	982.	0.105
205.	0.33	983.	0.106
206.	0.342	984.	0.102
207.	0.334	985.	0.106
208.	0.326	986.	0.097
209.	0.33	987.	0.106
210.	0.33	988.	0.11
211.	0.305	989.	0.094
212.	0.338	990.	0.127
213.	0.305	991.	0.097
214.	0.321	992.	0.106
215.	0.305	993.	0.122
216.	0.326	994.	0.115
217.	0.326	995.	0.085
218.	0.33	996.	0.097
219.	0.347	997.	0.092
220.	0.309	998.	0.109
221.	0.334	999.	0.118
222.	0.317	1000.	0.13
223.	0.313	1001.	0.101
224.	0.305	1002.	0.106
225.	0.301	1003.	0.102
226.	0.305	1004.	0.093
227.	0.309	1005.	0.105
228.	0.305	1006.	0.11
229.	0.301	1007.	0.115
230.	0.284	1008.	0.115
231.	0.301	1009.	0.11
232.	0.267	1010.	0.093
233.	0.283	1011.	0.093
234.	0.305	1012.	0.106
235.	0.283	1013.	0.102
236.	0.3	1014.	0.089
237.	0.297	1015.	0.11
238.	0.292	1016.	0.106
239.	0.322	1017.	0.106
240.	0.271	1018.	0.101
241.	0.259	1019.	0.115
242.	0.288	1020.	0.102
243.	0.297	1021.	0.106
244.	0.301	1022.	0.106
245.	0.271	1023.	0.11
246.	0.305	1024.	0.097
247.	0.268	1025.	0.089
248.	0.292	1026.	0.118
249.	0.28	1027.	0.098

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
250.	0.267	1028.	0.089
251.	0.28	1029.	0.101
252.	0.292	1030.	0.109
253.	0.268	1031.	0.113
254.	0.289	1032.	0.092
255.	0.263	1033.	0.102
256.	0.28	1034.	0.102
257.	0.276	1035.	0.093
258.	0.251	1036.	0.114
259.	0.259	1037.	0.122
260.	0.293	1038.	0.094
261.	0.276	1039.	0.106
262.	0.259	1040.	0.097
263.	0.263	1041.	0.11
264.	0.28	1042.	0.106
265.	0.285	1043.	0.106
266.	0.28	1044.	0.106
267.	0.251	1045.	0.093
268.	0.276	1046.	0.101
269.	0.28	1047.	0.097
270.	0.28	1048.	0.081
271.	0.289	1049.	0.092
272.	0.255	1050.	0.093
273.	0.28	1051.	0.077
274.	0.285	1052.	0.085
275.	0.25	1053.	0.111
276.	0.268	1054.	0.106
277.	0.268	1055.	0.085
278.	0.268	1056.	0.097
279.	0.222	1057.	0.085
280.	0.243	1058.	0.08
281.	0.277	1059.	0.101
282.	0.263	1060.	0.085
283.	0.251	1061.	0.106
284.	0.272	1062.	0.11
285.	0.234	1063.	0.106
286.	0.25	1064.	0.098
287.	0.243	1065.	0.089
288.	0.255	1066.	0.106
289.	0.243	1067.	0.102
290.	0.256	1068.	0.101
291.	0.238	1069.	0.068
292.	0.234	1070.	0.106
293.	0.23	1071.	0.085
294.	0.247	1072.	0.076
295.	0.243	1073.	0.102
296.	0.24	1074.	0.089
297.	0.243	1075.	0.11
298.	0.243	1076.	0.077
299.	0.25	1077.	0.124
300.	0.247	1078.	0.094
301.	0.239	1079.	0.081
302.	0.243	1080.	0.072
303.	0.238	1081.	0.077
304.	0.222	1082.	0.089
305.	0.238	1083.	0.11
306.	0.247	1084.	0.118

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
307.	0.231	1085.	0.097
308.	0.234	1086.	0.122
309.	0.23	1087.	0.109
310.	0.222	1088.	0.098
311.	0.213	1089.	0.114
312.	0.234	1090.	0.089
313.	0.234	1091.	0.111
314.	0.252	1092.	0.08
315.	0.264	1093.	0.089
316.	0.222	1094.	0.102
317.	0.235	1095.	0.119
318.	0.234	1096.	0.094
319.	0.234	1097.	0.081
320.	0.221	1098.	0.101
321.	0.231	1099.	0.073
322.	0.242	1100.	0.098
323.	0.231	1101.	0.081
324.	0.222	1102.	0.076
325.	0.247	1103.	0.097
326.	0.256	1104.	0.105
327.	0.23	1105.	0.094
328.	0.218	1106.	0.101
329.	0.238	1107.	0.105
330.	0.235	1108.	0.073
331.	0.243	1109.	0.094
332.	0.222	1110.	0.081
333.	0.235	1111.	0.098
334.	0.226	1112.	0.093
335.	0.213	1113.	0.094
336.	0.222	1114.	0.093
337.	0.251	1115.	0.115
338.	0.231	1116.	0.093
339.	0.217	1117.	0.076
340.	0.231	1118.	0.089
341.	0.214	1119.	0.105
342.	0.209	1120.	0.089
343.	0.209	1121.	0.093
344.	0.223	1122.	0.094
345.	0.226	1123.	0.092
346.	0.217	1124.	0.098
347.	0.197	1125.	0.106
348.	0.218	1126.	0.068
349.	0.234	1127.	0.09
350.	0.186	1128.	0.076
351.	0.24	1129.	0.102
352.	0.201	1130.	0.101
353.	0.205	1131.	0.088
354.	0.21	1132.	0.081
355.	0.206	1133.	0.103
356.	0.217	1134.	0.106
357.	0.205	1135.	0.106
358.	0.226	1136.	0.093
359.	0.205	1137.	0.081
360.	0.198	1138.	0.105
361.	0.214	1139.	0.106
362.	0.205	1140.	0.098
363.	0.214	1141.	0.089

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
364.	0.201	1142.	0.097
365.	0.217	1143.	0.11
366.	0.196	1144.	0.106
367.	0.21	1145.	0.114
368.	0.21	1146.	0.101
369.	0.205	1147.	0.113
370.	0.218	1148.	0.094
371.	0.196	1149.	0.102
372.	0.201	1150.	0.08
373.	0.222	1151.	0.089
374.	0.214	1152.	0.08
375.	0.205	1153.	0.093
376.	0.193	1154.	0.11
377.	0.193	1155.	0.109
378.	0.205	1156.	0.098
379.	0.193	1157.	0.094
380.	0.205	1158.	0.076
381.	0.193	1159.	0.11
382.	0.21	1160.	0.085
383.	0.21	1161.	0.103
384.	0.167	1162.	0.093
385.	0.197	1163.	0.098
386.	0.196	1164.	0.097
387.	0.198	1165.	0.102
388.	0.198	1166.	0.093
389.	0.201	1167.	0.093
390.	0.197	1168.	0.093
391.	0.21	1169.	0.088
392.	0.201	1170.	0.097
393.	0.18	1171.	0.093
394.	0.205	1172.	0.097
395.	0.202	1173.	0.092
396.	0.201	1174.	0.085
397.	0.202	1175.	0.101
398.	0.193	1176.	0.094
399.	0.192	1177.	0.115
400.	0.201	1178.	0.127
401.	0.189	1179.	0.085
402.	0.188	1180.	0.106
403.	0.184	1181.	0.081
404.	0.201	1182.	0.093
405.	0.185	1183.	0.076
406.	0.202	1184.	0.085
407.	0.18	1185.	0.089
408.	0.176	1186.	0.089
409.	0.189	1187.	0.106
410.	0.214	1188.	0.101
411.	0.192	1189.	0.092
412.	0.189	1190.	0.097
413.	0.205	1191.	0.081
414.	0.198	1192.	0.093
415.	0.189	1193.	0.073
416.	0.155	1194.	0.076
417.	0.192	1195.	0.102
418.	0.177	1196.	0.089
419.	0.172	1197.	0.081
420.	0.184	1198.	0.097

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
421.	0.198	1199.	0.068
422.	0.185	1200.	0.08
423.	0.193	1201.	0.089
424.	0.186	1202.	0.085
425.	0.189	1203.	0.089
426.	0.189	1204.	0.101
427.	0.19	1205.	0.085
428.	0.177	1206.	0.085
429.	0.205	1207.	0.093
430.	0.168	1208.	0.085
431.	0.19	1209.	0.094
432.	0.189	1210.	0.085
433.	0.181	1211.	0.089
434.	0.193	1212.	0.076
435.	0.169	1213.	0.093
436.	0.177	1214.	0.08
437.	0.193	1215.	0.084
438.	0.177	1216.	0.089
439.	0.189	1217.	0.076
440.	0.172	1218.	0.089
441.	0.172	1219.	0.093
442.	0.176	1220.	0.085
443.	0.168	1221.	0.101
444.	0.185	1222.	0.098
445.	0.184	1223.	0.097
446.	0.168	1224.	0.094
447.	0.181	1225.	0.098
448.	0.205	1226.	0.073
449.	0.164	1227.	0.085
450.	0.18	1228.	0.08
451.	0.186	1229.	0.098
452.	0.164	1230.	0.11
453.	0.185	1231.	0.076
454.	0.176	1232.	0.094
455.	0.172	1233.	0.089
456.	0.202	1234.	0.089
457.	0.193	1235.	0.102
458.	0.169	1236.	0.115
459.	0.181	1237.	0.077
460.	0.177	1238.	0.098
461.	0.155	1239.	0.064
462.	0.163	1240.	0.073
463.	0.172	1241.	0.072
464.	0.163	1242.	0.077
465.	0.181	1243.	0.085
466.	0.176	1244.	0.105
467.	0.156	1245.	0.089
468.	0.185	1246.	0.076
469.	0.172	1247.	0.068
470.	0.155	1248.	0.089
471.	0.155	1249.	0.08
472.	0.155	1250.	0.077
473.	0.177	1251.	0.085
474.	0.176	1252.	0.098
475.	0.172	1253.	0.089
476.	0.164	1254.	0.094
477.	0.16	1255.	0.089

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
478.	0.176	1256.	0.085
479.	0.155	1257.	0.093
480.	0.142	1258.	0.11
481.	0.155	1259.	0.059
482.	0.163	1260.	0.073
483.	0.139	1261.	0.08
484.	0.176	1262.	0.081
485.	0.16	1263.	0.068
486.	0.169	1264.	0.102
487.	0.156	1265.	0.076
488.	0.164	1266.	0.089
489.	0.152	1267.	0.077
490.	0.151	1268.	0.089
491.	0.164	1269.	0.08
492.	0.164	1270.	0.102
493.	0.155	1271.	0.102
494.	0.151	1272.	0.085
495.	0.151	1273.	0.089
496.	0.151	1274.	0.084
497.	0.151	1275.	0.098
498.	0.148	1276.	0.093
499.	0.151	1277.	0.089
500.	0.169	1278.	0.101
501.	0.143	1279.	0.081
502.	0.139	1280.	0.081
503.	0.16	1281.	0.085
504.	0.148	1282.	0.103
505.	0.142	1283.	0.089
506.	0.168	1284.	0.089
507.	0.139	1285.	0.055
508.	0.181	1286.	0.068
509.	0.168	1287.	0.051
510.	0.168	1288.	0.085
511.	0.18	1289.	0.076
512.	0.142	1290.	0.102
513.	0.157	1291.	0.11
514.	0.16	1292.	0.073
515.	0.16	1293.	0.077
516.	0.134	1294.	0.101
517.	0.138	1295.	0.098
518.	0.151	1296.	0.077
519.	0.152	1297.	0.106
520.	0.151	1298.	0.076
521.	0.164	1299.	0.101
522.	0.177	1300.	0.072
523.	0.16	1301.	0.072
524.	0.155	1302.	0.08
525.	0.151	1303.	0.073
526.	0.151	1304.	0.094
527.	0.151	1305.	0.077
528.	0.164	1306.	0.076
529.	0.152	1307.	0.085
530.	0.143	1308.	0.089
531.	0.172	1309.	0.073
532.	0.156	1310.	0.073
533.	0.151	1311.	0.08
534.	0.156	1312.	0.068

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
535.	0.16	1313.	0.061
536.	0.135	1314.	0.068
537.	0.147	1315.	0.073
538.	0.152	1316.	0.077
539.	0.135	1317.	0.063
540.	0.13	1318.	0.061
541.	0.143	1319.	0.077
542.	0.151	1320.	0.097
543.	0.164	1321.	0.102
544.	0.152	1322.	0.072
545.	0.16	1323.	0.089
546.	0.164	1324.	0.072
547.	0.147	1325.	0.084
548.	0.147	1326.	0.085
549.	0.152	1327.	0.084
550.	0.139	1328.	0.077
551.	0.148	1329.	0.08
552.	0.13	1330.	0.089
553.	0.139	1331.	0.084
554.	0.155	1332.	0.077
555.	0.143	1333.	0.092
556.	0.164	1334.	0.089
557.	0.143	1335.	0.071
558.	0.148	1336.	0.068
559.	0.143	1337.	0.072
560.	0.139	1338.	0.081
561.	0.147	1339.	0.081
562.	0.126	1340.	0.089
563.	0.13	1341.	0.085
564.	0.155	1342.	0.073
565.	0.151	1343.	0.094
566.	0.134	1344.	0.08
567.	0.155	1345.	0.094
568.	0.118	1346.	0.076
569.	0.135	1347.	0.077
570.	0.152	1348.	0.073
571.	0.143	1349.	0.056
572.	0.155	1350.	0.077
573.	0.147	1351.	0.089
574.	0.118	1352.	0.076
575.	0.131	1353.	0.08
576.	0.143	1354.	0.08
577.	0.155	1355.	0.089
578.	0.151	1356.	0.081
579.	0.147	1357.	0.082
580.	0.155	1358.	0.076
581.	0.13	1359.	0.059
582.	0.143	1360.	0.064
583.	0.151	1361.	0.08
584.	0.134	1362.	0.089
585.	0.155	1363.	0.056
586.	0.147	1364.	0.094
587.	0.143	1365.	0.077
588.	0.126	1366.	0.072
589.	0.13	1367.	0.05
590.	0.14	1368.	0.077
591.	0.134	1369.	0.073

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
592.	0.134	1370.	0.08
593.	0.155	1371.	0.085
594.	0.151	1372.	0.08
595.	0.143	1373.	0.061
596.	0.114	1374.	0.089
597.	0.122	1375.	0.064
598.	0.156	1376.	0.072
599.	0.152	1377.	0.068
600.	0.151	1378.	0.068
601.	0.126	1379.	0.085
602.	0.118	1380.	0.089
603.	0.139	1381.	0.076
604.	0.13	1382.	0.077
605.	0.126	1383.	0.064
606.	0.136	1384.	0.047
607.	0.139	1385.	0.068
608.	0.151	1386.	0.085
609.	0.134	1387.	0.073
610.	0.114	1388.	0.097
611.	0.134	1389.	0.088
612.	0.122	1390.	0.08
613.	0.134	1391.	0.089
614.	0.13	1392.	0.064
615.	0.143	1393.	0.06
616.	0.126	1394.	0.072
617.	0.13	1395.	0.071
618.	0.13	1396.	0.068
619.	0.126	1397.	0.067
620.	0.122	1398.	0.064
621.	0.131	1399.	0.085
622.	0.113	1400.	0.094
623.	0.13	1401.	0.094
624.	0.152	1402.	0.073
625.	0.127	1403.	0.089
626.	0.13	1404.	0.076
627.	0.143	1405.	0.086
628.	0.122	1406.	0.064
629.	0.131	1407.	0.094
630.	0.126	1408.	0.08
631.	0.13	1409.	0.094
632.	0.13	1410.	0.047
633.	0.134	1411.	0.055
634.	0.139	1412.	0.068
635.	0.13	1413.	0.076
636.	0.139	1414.	0.072
637.	0.139	1415.	0.064
638.	0.139	1416.	0.076
639.	0.126	1417.	0.072
640.	0.16	1418.	0.068
641.	0.122	1419.	0.077
642.	0.126	1420.	0.06
643.	0.148	1421.	0.081
644.	0.151	1422.	0.076
645.	0.118	1423.	0.073
646.	0.14	1424.	0.052
647.	0.126	1425.	0.064
648.	0.122	1426.	0.064

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
649.	0.106	1427.	0.068
650.	0.134	1428.	0.061
651.	0.105	1429.	0.076
652.	0.13	1430.	0.073
653.	0.109	1431.	0.059
654.	0.13	1432.	0.09
655.	0.118	1433.	0.059
656.	0.127	1434.	0.073
657.	0.125	1435.	0.068
658.	0.136	1436.	0.077
659.	0.109	1437.	0.055
660.	0.147	1438.	0.064
661.	0.113	1439.	0.064
662.	0.144	1440.	0.073
663.	0.136	1441.	0.068
664.	0.142	1442.	0.056
665.	0.139	1443.	0.068
666.	0.14	1444.	0.085
667.	0.148	1445.	0.076
668.	0.136	1446.	0.063
669.	0.131	1447.	0.077
670.	0.105	1448.	0.067
671.	0.139	1449.	0.081
672.	0.118	1450.	0.059
673.	0.106	1451.	0.08
674.	0.134	1452.	0.089
675.	0.134	1453.	0.08
676.	0.119	1454.	0.06
677.	0.13	1455.	0.064
678.	0.127	1456.	0.052
679.	0.127	1457.	0.056
680.	0.134	1458.	0.068
681.	0.123	1459.	0.06
682.	0.134	1460.	0.082
683.	0.131	1461.	0.076
684.	0.139	1462.	0.076
685.	0.131	1463.	0.076
686.	0.139	1464.	0.081
687.	0.139	1465.	0.076
688.	0.139	1466.	0.067
689.	0.127	1467.	0.064
690.	0.136	1468.	0.102
691.	0.11	1469.	0.068
692.	0.121	1470.	0.068
693.	0.122	1471.	0.085
694.	0.123	1472.	0.089
695.	0.109	1473.	0.068
696.	0.139	1474.	0.097
697.	0.11	1475.	0.067
698.	0.113	1476.	0.076
699.	0.14	1477.	0.089
700.	0.126	1478.	0.077
701.	0.118	1479.	0.068
702.	0.122	1480.	0.052
703.	0.123	1481.	0.077
704.	0.138	1482.	0.051
705.	0.119	1483.	0.098

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
706.	0.105	1484.	0.081
707.	0.11	1485.	0.097
708.	0.097	1486.	0.097
709.	0.11	1487.	0.06
710.	0.113	1488.	0.076
711.	0.106	1489.	0.085
712.	0.118	1490.	0.059
713.	0.115	1491.	0.071
714.	0.092	1492.	0.055
715.	0.119	1493.	0.059
716.	0.118	1494.	0.064
717.	0.123	1495.	0.097
718.	0.113	1496.	0.085
719.	0.106	1497.	0.072
720.	0.11	1498.	0.084
721.	0.131	1499.	0.056
722.	0.122	1500.	0.055
723.	0.127	1501.	0.071
724.	0.097	1502.	0.071
725.	0.131	1503.	0.06
726.	0.105	1504.	0.089
727.	0.114	1505.	0.077
728.	0.122	1506.	0.089
729.	0.136	1507.	0.089
730.	0.139	1508.	0.06
731.	0.118	1509.	0.06
732.	0.109	1510.	0.056
733.	0.106	1511.	0.055
734.	0.097	1512.	0.064
735.	0.119	1513.	0.085
736.	0.101	1514.	0.05
737.	0.115	1515.	0.06
738.	0.118	1516.	0.077
739.	0.123	1517.	0.047
740.	0.13	1518.	0.082
741.	0.127	1519.	0.068
742.	0.109	1520.	0.056
743.	0.127	1521.	0.081
744.	0.115	1522.	0.052
745.	0.109	1523.	0.051
746.	0.136	1524.	0.073
747.	0.113	1525.	0.077
748.	0.089	1526.	0.073
749.	0.105	1527.	0.068
750.	0.144	1528.	0.031
751.	0.134	1529.	0.064
752.	0.11	1530.	0.076
753.	0.106	1531.	0.064
754.	0.123	1532.	0.051
755.	0.135	1533.	0.052
756.	0.11	1534.	0.073
757.	0.114	1535.	0.073
758.	0.118	1536.	0.072
759.	0.123	1537.	0.06
760.	0.101	1538.	0.072
761.	0.11	1539.	0.064
762.	0.113	1540.	0.064

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
763.	0.118	1541.	0.043
764.	0.106	1542.	0.051
765.	0.127	1543.	0.059
766.	0.118	1544.	0.068
767.	0.113	1545.	0.059
768.	0.118	1546.	0.052
769.	0.126	1547.	0.06
770.	0.114	1548.	0.059
771.	0.092	1549.	0.056
772.	0.106	1550.	0.072
773.	0.122	1551.	0.064
774.	0.109	1552.	0.064
775.	0.123	1553.	0.059
776.	0.127	1554.	0.068
777.	0.102	1555.	0.068
778.	0.106	1556.	0.038

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	9.756E-5	cm/sec
Ss	0.005128	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.05799 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	9.972E-5	1.245E-6	+/- 2.441E-6	80.09	cm/sec
Ss	0.005128	0.0002334	+/- 0.0004577	21.97	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.05927 cm^2/sec

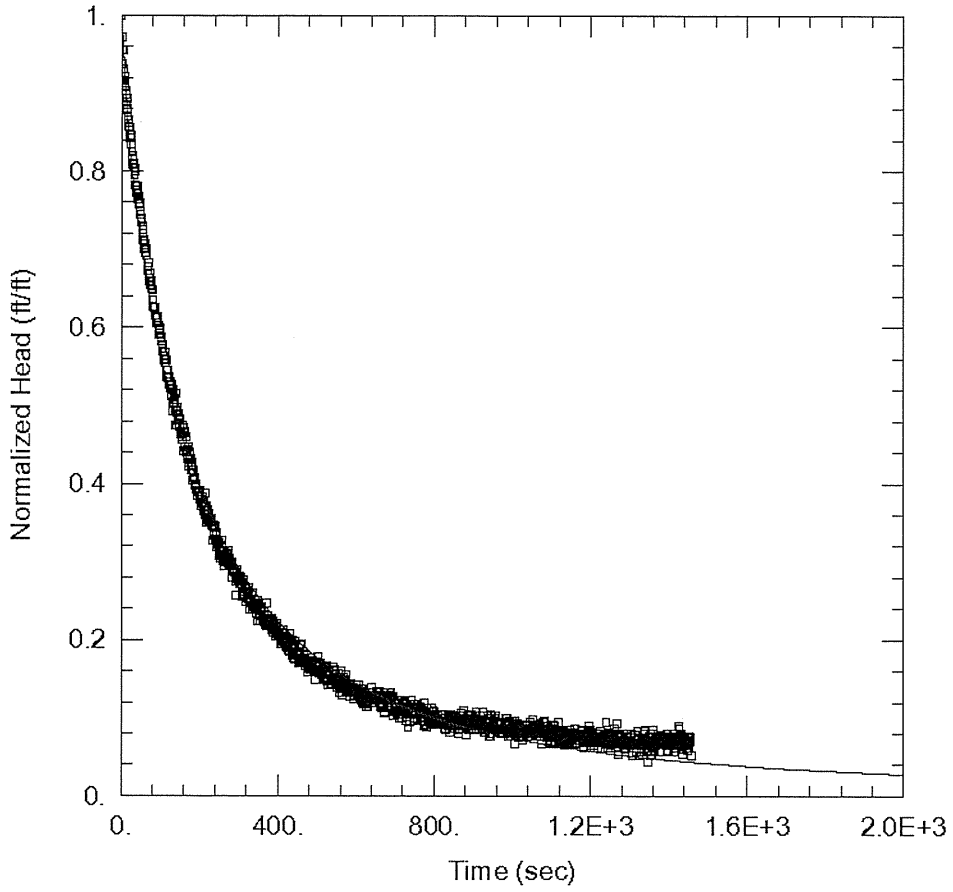
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.92
Ss	-0.92	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 1.747 ft^2
Variance ..... 0.001124 ft^2
Std. Deviation..... 0.03353 ft
Mean..... 0.01549 ft
No. of Residuals .. 1556
No. of Estimates .. 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-11.aqt
Date: 11/29/21 Time: 18:17:34

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-11
Test Date: 11/17/21

AQUIFER DATA

Saturated Thickness: 20. ft

WELL DATA (PWCG-11)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 18.81 ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.27 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model
Kr = 7.724E-5 cm/sec
Kz/Kr = 1.
Ss = 0.001183 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-11.aqt
Date: 11/29/21
Time: 18:17:46

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/17/21
Test Well: PWCG-11

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-11

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 25.27 ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 15. ft
Total Well Penetration Depth: 18.81 ft

No. of Observations: 1458

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.614	730.	0.194
2.	1.588	731.	0.173
3.	1.559	732.	0.169
4.	1.589	733.	0.178
5.	1.547	734.	0.145
6.	1.522	735.	0.183
7.	1.53	736.	0.173
8.	1.517	737.	0.186
9.	1.513	738.	0.157
10.	1.509	739.	0.161
11.	1.492	740.	0.191
12.	1.501	741.	0.179
13.	1.471	742.	0.203
14.	1.484	743.	0.187
15.	1.463	744.	0.187
16.	1.459	745.	0.19
17.	1.446	746.	0.173
18.	1.438	747.	0.194
19.	1.426	748.	0.186
20.	1.417	749.	0.194
21.	1.422	750.	0.194

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	1.401	751.	0.165
23.	1.388	752.	0.161
24.	1.405	753.	0.194
25.	1.388	754.	0.173
26.	1.371	755.	0.191
27.	1.358	756.	0.182
28.	1.342	757.	0.186
29.	1.363	758.	0.194
30.	1.347	759.	0.162
31.	1.338	760.	0.175
32.	1.337	761.	0.174
33.	1.321	762.	0.173
34.	1.334	763.	0.191
35.	1.33	764.	0.175
36.	1.3	765.	0.165
37.	1.296	766.	0.173
38.	1.288	767.	0.178
39.	1.284	768.	0.187
40.	1.296	769.	0.161
41.	1.28	770.	0.174
42.	1.271	771.	0.161
43.	1.276	772.	0.161
44.	1.259	773.	0.182
45.	1.271	774.	0.149
46.	1.246	775.	0.199
47.	1.263	776.	0.161
48.	1.238	777.	0.152
49.	1.221	778.	0.169
50.	1.23	779.	0.169
51.	1.226	780.	0.175
52.	1.23	781.	0.145
53.	1.196	782.	0.187
54.	1.205	783.	0.158
55.	1.184	784.	0.157
56.	1.213	785.	0.174
57.	1.176	786.	0.178
58.	1.163	787.	0.161
59.	1.184	788.	0.17
60.	1.176	789.	0.17
61.	1.155	790.	0.157
62.	1.163	791.	0.174
63.	1.155	792.	0.153
64.	1.163	793.	0.173
65.	1.15	794.	0.186
66.	1.125	795.	0.17
67.	1.125	796.	0.174
68.	1.117	797.	0.152
69.	1.134	798.	0.169
70.	1.1	799.	0.182
71.	1.096	800.	0.178
72.	1.096	801.	0.161
73.	1.096	802.	0.153
74.	1.113	803.	0.166
75.	1.088	804.	0.161
76.	1.08	805.	0.173
77.	1.084	806.	0.152
78.	1.092	807.	0.165

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	1.096	808.	0.161
80.	1.076	809.	0.17
81.	1.054	810.	0.162
82.	1.042	811.	0.174
83.	1.038	812.	0.161
84.	1.038	813.	0.154
85.	1.038	814.	0.157
86.	1.038	815.	0.161
87.	1.038	816.	0.165
88.	1.021	817.	0.173
89.	1.005	818.	0.165
90.	1.021	819.	0.165
91.	1.017	820.	0.161
92.	1.005	821.	0.157
93.	1.021	822.	0.161
94.	1.005	823.	0.173
95.	1.005	824.	0.158
96.	1.001	825.	0.154
97.	0.993	826.	0.152
98.	0.98	827.	0.144
99.	0.996	828.	0.157
100.	0.98	829.	0.161
101.	0.984	830.	0.14
102.	0.972	831.	0.173
103.	0.976	832.	0.157
104.	0.967	833.	0.161
105.	0.951	834.	0.161
106.	0.959	835.	0.17
107.	0.947	836.	0.148
108.	0.946	837.	0.152
109.	0.934	838.	0.169
110.	0.93	839.	0.17
111.	0.926	840.	0.157
112.	0.922	841.	0.136
113.	0.934	842.	0.173
114.	0.943	843.	0.149
115.	0.926	844.	0.157
116.	0.905	845.	0.174
117.	0.893	846.	0.169
118.	0.892	847.	0.17
119.	0.888	848.	0.157
120.	0.906	849.	0.166
121.	0.888	850.	0.166
122.	0.893	851.	0.153
123.	0.875	852.	0.157
124.	0.88	853.	0.144
125.	0.867	854.	0.154
126.	0.88	855.	0.166
127.	0.872	856.	0.17
128.	0.855	857.	0.161
129.	0.876	858.	0.162
130.	0.85	859.	0.153
131.	0.855	860.	0.149
132.	0.864	861.	0.149
133.	0.838	862.	0.132
134.	0.817	863.	0.14
135.	0.847	864.	0.157

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
136.	0.835	865.	0.153
137.	0.842	866.	0.144
138.	0.856	867.	0.154
139.	0.821	868.	0.161
140.	0.788	869.	0.149
141.	0.814	870.	0.149
142.	0.814	871.	0.175
143.	0.788	872.	0.149
144.	0.826	873.	0.17
145.	0.809	874.	0.17
146.	0.8	875.	0.182
147.	0.814	876.	0.149
148.	0.785	877.	0.149
149.	0.792	878.	0.157
150.	0.801	879.	0.162
151.	0.776	880.	0.153
152.	0.768	881.	0.131
153.	0.776	882.	0.144
154.	0.776	883.	0.166
155.	0.764	884.	0.153
156.	0.759	885.	0.17
157.	0.789	886.	0.153
158.	0.784	887.	0.166
159.	0.734	888.	0.141
160.	0.771	889.	0.149
161.	0.772	890.	0.154
162.	0.776	891.	0.157
163.	0.743	892.	0.152
164.	0.73	893.	0.174
165.	0.764	894.	0.161
166.	0.734	895.	0.173
167.	0.735	896.	0.17
168.	0.738	897.	0.144
169.	0.722	898.	0.158
170.	0.718	899.	0.152
171.	0.743	900.	0.153
172.	0.71	901.	0.161
173.	0.701	902.	0.161
174.	0.717	903.	0.149
175.	0.731	904.	0.17
176.	0.714	905.	0.165
177.	0.726	906.	0.152
178.	0.705	907.	0.14
179.	0.693	908.	0.157
180.	0.717	909.	0.144
181.	0.709	910.	0.179
182.	0.693	911.	0.157
183.	0.672	912.	0.158
184.	0.689	913.	0.161
185.	0.676	914.	0.162
186.	0.693	915.	0.157
187.	0.677	916.	0.149
188.	0.663	917.	0.161
189.	0.659	918.	0.158
190.	0.651	919.	0.17
191.	0.663	920.	0.153
192.	0.655	921.	0.148

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
193.	0.655	922.	0.141
194.	0.651	923.	0.14
195.	0.638	924.	0.157
196.	0.647	925.	0.148
197.	0.647	926.	0.179
198.	0.651	927.	0.148
199.	0.647	928.	0.145
200.	0.638	929.	0.136
201.	0.651	930.	0.136
202.	0.63	931.	0.161
203.	0.635	932.	0.136
204.	0.63	933.	0.161
205.	0.618	934.	0.158
206.	0.626	935.	0.154
207.	0.626	936.	0.145
208.	0.635	937.	0.17
209.	0.622	938.	0.161
210.	0.622	939.	0.145
211.	0.626	940.	0.149
212.	0.606	941.	0.166
213.	0.597	942.	0.127
214.	0.643	943.	0.158
215.	0.618	944.	0.128
216.	0.601	945.	0.174
217.	0.618	946.	0.132
218.	0.597	947.	0.17
219.	0.58	948.	0.145
220.	0.601	949.	0.148
221.	0.588	950.	0.161
222.	0.609	951.	0.149
223.	0.588	952.	0.14
224.	0.58	953.	0.149
225.	0.601	954.	0.152
226.	0.58	955.	0.153
227.	0.58	956.	0.166
228.	0.58	957.	0.17
229.	0.589	958.	0.145
230.	0.589	959.	0.145
231.	0.585	960.	0.14
232.	0.576	961.	0.157
233.	0.572	962.	0.144
234.	0.543	963.	0.141
235.	0.576	964.	0.153
236.	0.555	965.	0.14
237.	0.573	966.	0.136
238.	0.571	967.	0.154
239.	0.577	968.	0.14
240.	0.573	969.	0.145
241.	0.543	970.	0.132
242.	0.547	971.	0.158
243.	0.543	972.	0.153
244.	0.53	973.	0.145
245.	0.56	974.	0.14
246.	0.534	975.	0.145
247.	0.535	976.	0.132
248.	0.54	977.	0.145
249.	0.51	978.	0.14

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
250.	0.523	979.	0.141
251.	0.531	980.	0.14
252.	0.506	981.	0.145
253.	0.51	982.	0.149
254.	0.522	983.	0.14
255.	0.51	984.	0.166
256.	0.513	985.	0.153
257.	0.522	986.	0.166
258.	0.543	987.	0.154
259.	0.543	988.	0.157
260.	0.522	989.	0.127
261.	0.51	990.	0.145
262.	0.501	991.	0.158
263.	0.518	992.	0.161
264.	0.505	993.	0.158
265.	0.488	994.	0.149
266.	0.501	995.	0.14
267.	0.497	996.	0.128
268.	0.514	997.	0.145
269.	0.517	998.	0.145
270.	0.496	999.	0.132
271.	0.514	1000.	0.141
272.	0.513	1001.	0.161
273.	0.523	1002.	0.141
274.	0.494	1003.	0.136
275.	0.493	1004.	0.141
276.	0.494	1005.	0.149
277.	0.507	1006.	0.137
278.	0.49	1007.	0.161
279.	0.489	1008.	0.111
280.	0.493	1009.	0.149
281.	0.489	1010.	0.149
282.	0.463	1011.	0.149
283.	0.497	1012.	0.149
284.	0.489	1013.	0.141
285.	0.48	1014.	0.136
286.	0.477	1015.	0.154
287.	0.48	1016.	0.124
288.	0.484	1017.	0.132
289.	0.481	1018.	0.149
290.	0.476	1019.	0.153
291.	0.48	1020.	0.149
292.	0.455	1021.	0.153
293.	0.468	1022.	0.141
294.	0.427	1023.	0.14
295.	0.48	1024.	0.14
296.	0.464	1025.	0.145
297.	0.461	1026.	0.136
298.	0.463	1027.	0.12
299.	0.468	1028.	0.133
300.	0.456	1029.	0.128
301.	0.465	1030.	0.128
302.	0.451	1031.	0.128
303.	0.468	1032.	0.145
304.	0.469	1033.	0.14
305.	0.452	1034.	0.145
306.	0.465	1035.	0.14

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
307.	0.451	1036.	0.136
308.	0.444	1037.	0.153
309.	0.452	1038.	0.141
310.	0.448	1039.	0.128
311.	0.423	1040.	0.149
312.	0.46	1041.	0.136
313.	0.46	1042.	0.128
314.	0.435	1043.	0.133
315.	0.444	1044.	0.14
316.	0.427	1045.	0.14
317.	0.444	1046.	0.158
318.	0.439	1047.	0.133
319.	0.414	1048.	0.128
320.	0.439	1049.	0.136
321.	0.431	1050.	0.128
322.	0.432	1051.	0.137
323.	0.422	1052.	0.145
324.	0.427	1053.	0.14
325.	0.444	1054.	0.162
326.	0.432	1055.	0.149
327.	0.418	1056.	0.133
328.	0.427	1057.	0.148
329.	0.397	1058.	0.149
330.	0.414	1059.	0.153
331.	0.411	1060.	0.137
332.	0.418	1061.	0.136
333.	0.415	1062.	0.136
334.	0.41	1063.	0.141
335.	0.397	1064.	0.152
336.	0.406	1065.	0.153
337.	0.432	1066.	0.137
338.	0.41	1067.	0.136
339.	0.41	1068.	0.132
340.	0.402	1069.	0.141
341.	0.406	1070.	0.14
342.	0.398	1071.	0.154
343.	0.407	1072.	0.132
344.	0.398	1073.	0.145
345.	0.389	1074.	0.128
346.	0.398	1075.	0.137
347.	0.402	1076.	0.136
348.	0.415	1077.	0.111
349.	0.397	1078.	0.133
350.	0.373	1079.	0.133
351.	0.385	1080.	0.157
352.	0.406	1081.	0.142
353.	0.385	1082.	0.161
354.	0.372	1083.	0.128
355.	0.382	1084.	0.133
356.	0.399	1085.	0.145
357.	0.398	1086.	0.136
358.	0.393	1087.	0.128
359.	0.402	1088.	0.124
360.	0.39	1089.	0.133
361.	0.372	1090.	0.149
362.	0.376	1091.	0.132
363.	0.377	1092.	0.137

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
364.	0.369	1093.	0.149
365.	0.382	1094.	0.119
366.	0.386	1095.	0.142
367.	0.364	1096.	0.132
368.	0.376	1097.	0.124
369.	0.365	1098.	0.115
370.	0.372	1099.	0.111
371.	0.411	1100.	0.141
372.	0.378	1101.	0.132
373.	0.361	1102.	0.14
374.	0.382	1103.	0.145
375.	0.369	1104.	0.132
376.	0.368	1105.	0.124
377.	0.382	1106.	0.153
378.	0.36	1107.	0.132
379.	0.368	1108.	0.115
380.	0.369	1109.	0.115
381.	0.373	1110.	0.149
382.	0.368	1111.	0.111
383.	0.352	1112.	0.124
384.	0.36	1113.	0.132
385.	0.378	1114.	0.141
386.	0.368	1115.	0.124
387.	0.352	1116.	0.128
388.	0.365	1117.	0.141
389.	0.348	1118.	0.128
390.	0.373	1119.	0.157
391.	0.352	1120.	0.125
392.	0.364	1121.	0.133
393.	0.356	1122.	0.111
394.	0.352	1123.	0.124
395.	0.34	1124.	0.111
396.	0.36	1125.	0.141
397.	0.36	1126.	0.111
398.	0.344	1127.	0.119
399.	0.368	1128.	0.124
400.	0.349	1129.	0.111
401.	0.339	1130.	0.137
402.	0.341	1131.	0.133
403.	0.339	1132.	0.115
404.	0.344	1133.	0.124
405.	0.353	1134.	0.119
406.	0.331	1135.	0.124
407.	0.34	1136.	0.108
408.	0.328	1137.	0.124
409.	0.323	1138.	0.115
410.	0.345	1139.	0.136
411.	0.322	1140.	0.133
412.	0.348	1141.	0.115
413.	0.344	1142.	0.124
414.	0.353	1143.	0.136
415.	0.332	1144.	0.124
416.	0.34	1145.	0.133
417.	0.331	1146.	0.132
418.	0.324	1147.	0.141
419.	0.34	1148.	0.119
420.	0.34	1149.	0.111

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
421.	0.318	1150.	0.128
422.	0.328	1151.	0.12
423.	0.315	1152.	0.124
424.	0.327	1153.	0.132
425.	0.318	1154.	0.12
426.	0.335	1155.	0.128
427.	0.31	1156.	0.128
428.	0.319	1157.	0.128
429.	0.307	1158.	0.136
430.	0.332	1159.	0.124
431.	0.306	1160.	0.115
432.	0.344	1161.	0.119
433.	0.314	1162.	0.145
434.	0.315	1163.	0.111
435.	0.332	1164.	0.133
436.	0.299	1165.	0.132
437.	0.332	1166.	0.115
438.	0.311	1167.	0.128
439.	0.294	1168.	0.119
440.	0.311	1169.	0.119
441.	0.311	1170.	0.132
442.	0.302	1171.	0.129
443.	0.328	1172.	0.12
444.	0.316	1173.	0.115
445.	0.29	1174.	0.115
446.	0.304	1175.	0.115
447.	0.303	1176.	0.141
448.	0.307	1177.	0.137
449.	0.299	1178.	0.132
450.	0.303	1179.	0.124
451.	0.302	1180.	0.141
452.	0.307	1181.	0.124
453.	0.303	1182.	0.12
454.	0.282	1183.	0.128
455.	0.303	1184.	0.116
456.	0.282	1185.	0.102
457.	0.32	1186.	0.119
458.	0.299	1187.	0.12
459.	0.282	1188.	0.133
460.	0.323	1189.	0.124
461.	0.282	1190.	0.132
462.	0.294	1191.	0.133
463.	0.289	1192.	0.128
464.	0.286	1193.	0.128
465.	0.282	1194.	0.137
466.	0.298	1195.	0.115
467.	0.302	1196.	0.149
468.	0.285	1197.	0.137
469.	0.277	1198.	0.115
470.	0.293	1199.	0.107
471.	0.277	1200.	0.137
472.	0.286	1201.	0.14
473.	0.286	1202.	0.136
474.	0.287	1203.	0.129
475.	0.264	1204.	0.136
476.	0.281	1205.	0.133
477.	0.289	1206.	0.124

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
478.	0.272	1207.	0.116
479.	0.286	1208.	0.132
480.	0.283	1209.	0.102
481.	0.286	1210.	0.12
482.	0.277	1211.	0.107
483.	0.293	1212.	0.128
484.	0.269	1213.	0.116
485.	0.287	1214.	0.124
486.	0.294	1215.	0.119
487.	0.286	1216.	0.12
488.	0.274	1217.	0.12
489.	0.273	1218.	0.115
490.	0.273	1219.	0.12
491.	0.286	1220.	0.102
492.	0.269	1221.	0.119
493.	0.269	1222.	0.128
494.	0.265	1223.	0.119
495.	0.248	1224.	0.132
496.	0.265	1225.	0.115
497.	0.278	1226.	0.137
498.	0.273	1227.	0.124
499.	0.265	1228.	0.124
500.	0.266	1229.	0.124
501.	0.286	1230.	0.12
502.	0.295	1231.	0.124
503.	0.273	1232.	0.128
504.	0.273	1233.	0.119
505.	0.26	1234.	0.128
506.	0.269	1235.	0.119
507.	0.26	1236.	0.133
508.	0.269	1237.	0.12
509.	0.269	1238.	0.111
510.	0.281	1239.	0.128
511.	0.282	1240.	0.129
512.	0.269	1241.	0.157
513.	0.262	1242.	0.119
514.	0.257	1243.	0.124
515.	0.27	1244.	0.129
516.	0.252	1245.	0.102
517.	0.269	1246.	0.124
518.	0.248	1247.	0.116
519.	0.27	1248.	0.136
520.	0.274	1249.	0.111
521.	0.265	1250.	0.12
522.	0.262	1251.	0.107
523.	0.248	1252.	0.111
524.	0.261	1253.	0.098
525.	0.262	1254.	0.128
526.	0.277	1255.	0.116
527.	0.245	1256.	0.12
528.	0.249	1257.	0.132
529.	0.236	1258.	0.132
530.	0.265	1259.	0.128
531.	0.261	1260.	0.119
532.	0.266	1261.	0.132
533.	0.265	1262.	0.145
534.	0.248	1263.	0.119

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
535.	0.239	1264.	0.124
536.	0.248	1265.	0.12
537.	0.24	1266.	0.104
538.	0.244	1267.	0.111
539.	0.235	1268.	0.111
540.	0.252	1269.	0.128
541.	0.252	1270.	0.154
542.	0.265	1271.	0.09
543.	0.273	1272.	0.132
544.	0.269	1273.	0.128
545.	0.244	1274.	0.129
546.	0.257	1275.	0.111
547.	0.239	1276.	0.115
548.	0.262	1277.	0.116
549.	0.253	1278.	0.128
550.	0.249	1279.	0.115
551.	0.232	1280.	0.115
552.	0.232	1281.	0.12
553.	0.235	1282.	0.116
554.	0.244	1283.	0.124
555.	0.248	1284.	0.115
556.	0.252	1285.	0.12
557.	0.26	1286.	0.103
558.	0.22	1287.	0.115
559.	0.241	1288.	0.108
560.	0.248	1289.	0.099
561.	0.227	1290.	0.119
562.	0.266	1291.	0.124
563.	0.232	1292.	0.132
564.	0.215	1293.	0.116
565.	0.227	1294.	0.133
566.	0.239	1295.	0.119
567.	0.228	1296.	0.111
568.	0.232	1297.	0.128
569.	0.244	1298.	0.119
570.	0.252	1299.	0.111
571.	0.248	1300.	0.124
572.	0.232	1301.	0.119
573.	0.24	1302.	0.124
574.	0.257	1303.	0.12
575.	0.219	1304.	0.133
576.	0.24	1305.	0.132
577.	0.227	1306.	0.107
578.	0.24	1307.	0.111
579.	0.22	1308.	0.107
580.	0.223	1309.	0.086
581.	0.227	1310.	0.111
582.	0.236	1311.	0.108
583.	0.24	1312.	0.102
584.	0.211	1313.	0.111
585.	0.22	1314.	0.129
586.	0.22	1315.	0.124
587.	0.236	1316.	0.112
588.	0.223	1317.	0.111
589.	0.24	1318.	0.094
590.	0.232	1319.	0.119
591.	0.227	1320.	0.111

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
592.	0.219	1321.	0.137
593.	0.206	1322.	0.111
594.	0.211	1323.	0.086
595.	0.224	1324.	0.124
596.	0.229	1325.	0.12
597.	0.228	1326.	0.115
598.	0.215	1327.	0.115
599.	0.219	1328.	0.107
600.	0.236	1329.	0.099
601.	0.227	1330.	0.12
602.	0.223	1331.	0.095
603.	0.224	1332.	0.102
604.	0.224	1333.	0.124
605.	0.227	1334.	0.112
606.	0.211	1335.	0.124
607.	0.227	1336.	0.132
608.	0.236	1337.	0.119
609.	0.211	1338.	0.107
610.	0.215	1339.	0.137
611.	0.224	1340.	0.119
612.	0.219	1341.	0.111
613.	0.202	1342.	0.14
614.	0.227	1343.	0.098
615.	0.211	1344.	0.111
616.	0.208	1345.	0.12
617.	0.215	1346.	0.124
618.	0.199	1347.	0.094
619.	0.227	1348.	0.073
620.	0.194	1349.	0.102
621.	0.223	1350.	0.116
622.	0.215	1351.	0.128
623.	0.199	1352.	0.119
624.	0.211	1353.	0.111
625.	0.212	1354.	0.086
626.	0.202	1355.	0.133
627.	0.215	1356.	0.09
628.	0.19	1357.	0.098
629.	0.194	1358.	0.107
630.	0.206	1359.	0.128
631.	0.203	1360.	0.14
632.	0.19	1361.	0.115
633.	0.203	1362.	0.133
634.	0.216	1363.	0.115
635.	0.215	1364.	0.107
636.	0.202	1365.	0.094
637.	0.219	1366.	0.107
638.	0.215	1367.	0.108
639.	0.203	1368.	0.107
640.	0.232	1369.	0.119
641.	0.202	1370.	0.115
642.	0.207	1371.	0.12
643.	0.198	1372.	0.124
644.	0.22	1373.	0.111
645.	0.211	1374.	0.124
646.	0.203	1375.	0.12
647.	0.202	1376.	0.128
648.	0.207	1377.	0.111

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
649.	0.207	1378.	0.119
650.	0.206	1379.	0.115
651.	0.211	1380.	0.094
652.	0.223	1381.	0.129
653.	0.215	1382.	0.12
654.	0.202	1383.	0.128
655.	0.208	1384.	0.116
656.	0.211	1385.	0.119
657.	0.211	1386.	0.12
658.	0.219	1387.	0.12
659.	0.199	1388.	0.124
660.	0.223	1389.	0.111
661.	0.203	1390.	0.111
662.	0.211	1391.	0.124
663.	0.19	1392.	0.116
664.	0.194	1393.	0.107
665.	0.202	1394.	0.116
666.	0.186	1395.	0.133
667.	0.198	1396.	0.098
668.	0.207	1397.	0.112
669.	0.187	1398.	0.095
670.	0.186	1399.	0.119
671.	0.194	1400.	0.094
672.	0.178	1401.	0.125
673.	0.219	1402.	0.124
674.	0.177	1403.	0.128
675.	0.212	1404.	0.12
676.	0.208	1405.	0.115
677.	0.215	1406.	0.107
678.	0.203	1407.	0.12
679.	0.203	1408.	0.107
680.	0.198	1409.	0.119
681.	0.186	1410.	0.107
682.	0.208	1411.	0.124
683.	0.19	1412.	0.107
684.	0.199	1413.	0.133
685.	0.215	1414.	0.095
686.	0.207	1415.	0.12
687.	0.186	1416.	0.111
688.	0.22	1417.	0.119
689.	0.203	1418.	0.124
690.	0.202	1419.	0.116
691.	0.219	1420.	0.103
692.	0.191	1421.	0.107
693.	0.203	1422.	0.111
694.	0.211	1423.	0.108
695.	0.17	1424.	0.115
696.	0.211	1425.	0.149
697.	0.212	1426.	0.119
698.	0.178	1427.	0.128
699.	0.194	1428.	0.145
700.	0.199	1429.	0.119
701.	0.191	1430.	0.132
702.	0.178	1431.	0.128
703.	0.182	1432.	0.132
704.	0.173	1433.	0.099
705.	0.19	1434.	0.125

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
706.	0.187	1435.	0.124
707.	0.182	1436.	0.09
708.	0.174	1437.	0.119
709.	0.182	1438.	0.107
710.	0.178	1439.	0.124
711.	0.178	1440.	0.116
712.	0.166	1441.	0.112
713.	0.195	1442.	0.124
714.	0.174	1443.	0.107
715.	0.19	1444.	0.112
716.	0.178	1445.	0.102
717.	0.187	1446.	0.115
718.	0.203	1447.	0.119
719.	0.166	1448.	0.125
720.	0.199	1449.	0.098
721.	0.196	1450.	0.111
722.	0.182	1451.	0.128
723.	0.185	1452.	0.111
724.	0.203	1453.	0.125
725.	0.182	1454.	0.102
726.	0.178	1455.	0.124
727.	0.202	1456.	0.116
728.	0.161	1457.	0.124
729.	0.178	1458.	0.086

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	5.676E-5	cm/sec
Ss	0.005	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.0346 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	7.724E-5	6.253E-7	+/- 1.227E-6	123.5	cm/sec
Ss	0.001183	4.97E-5	+/- 9.752E-5	23.81	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.04709 cm^2/sec

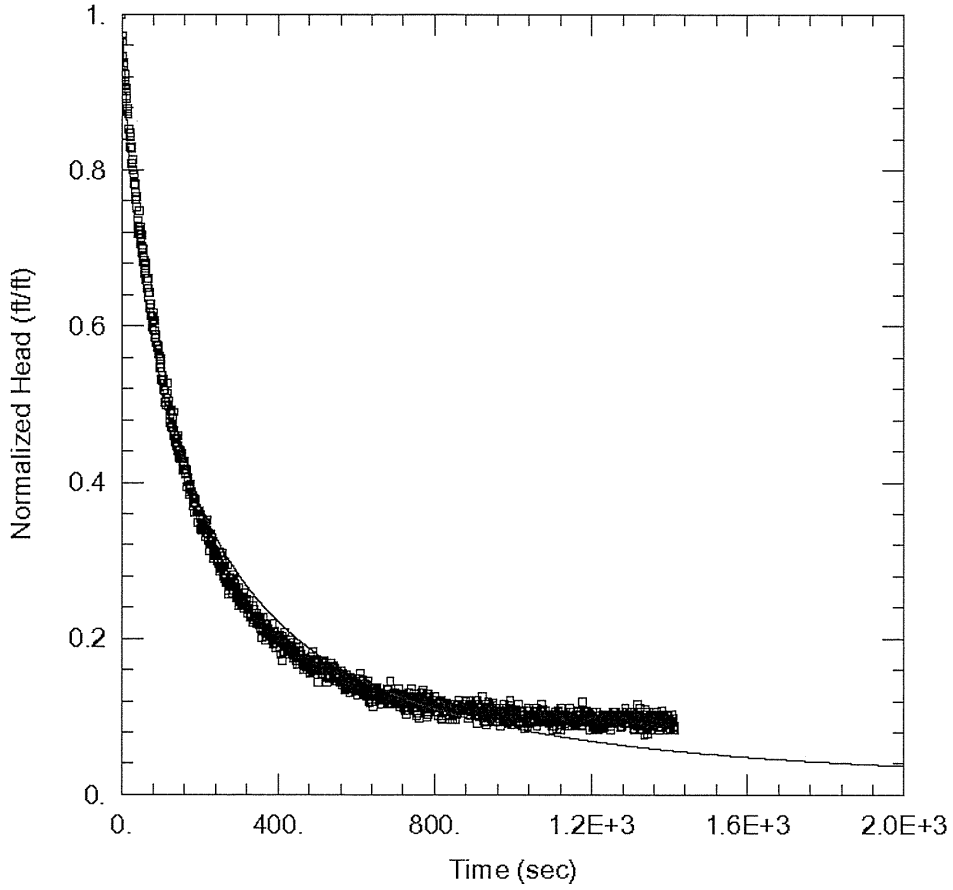
Parameter Correlations

	Kr	Ss
Kr	1.00	-0.94
Ss	-0.94	1.00

Residual Statistics

for weighted residuals

Sum of Squares... 1.108 ft^2
Variance ..... 0.0007613 ft^2
Std. Deviation..... 0.02759 ft
Mean..... 0.007362 ft
No. of Residuals .. 1458
No. of Estimates .. 2



WELL TEST ANALYSIS

Data Set: D:\...\PWCG-12.aqt
Date: 11/29/21 Time: 18:16:32

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Well: PWCG-12
Test Date: 11/17/21

AQUIFER DATA

Saturated Thickness: 20. ft

WELL DATA (PWCG-12)

Initial Displacement: 1.662 ft
Total Well Penetration Depth: 19.2 ft
Casing Radius: 0.083 ft
Static Water Column Height: 32.13 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 5.912E-5 cm/sec
Kz/Kr = 1.
Ss = 0.004673 ft^{-1}

Data Set: D:\Remote\TCLF\Expansion 2021\Subsurface Investigation\Water Levels\Slugs\Reports\PWCG-12.aqt
Date: 11/29/21
Time: 18:16:18

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Waste Connections
Project: 0771-368-11
Location: Turkey Creek Landfill
Test Date: 11/17/21
Test Well: PWCG-12

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PWCG-12

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.662 ft
Static Water Column Height: 32.13 ft
Casing Radius: 0.083 ft
Well Radius: 0.083 ft
Well Skin Radius: 0.25 ft
Screen Length: 15. ft
Total Well Penetration Depth: 19.2 ft

No. of Observations: 1413

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	1.617	708.	0.193
2.	1.604	709.	0.204
3.	1.571	710.	0.226
4.	1.554	711.	0.208
5.	1.558	712.	0.187
6.	1.554	713.	0.209
7.	1.533	714.	0.187
8.	1.508	715.	0.201
9.	1.513	716.	0.196
10.	1.517	717.	0.191
11.	1.504	718.	0.214
12.	1.483	719.	0.212
13.	1.488	720.	0.205
14.	1.455	721.	0.184
15.	1.459	722.	0.209
16.	1.455	723.	0.188
17.	1.45	724.	0.179
18.	1.417	725.	0.2
19.	1.417	726.	0.188
20.	1.401	727.	0.197
21.	1.409	728.	0.184

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.	1.379	729.	0.17
23.	1.38	730.	0.196
24.	1.376	731.	0.195
25.	1.343	732.	0.196
26.	1.342	733.	0.179
27.	1.351	734.	0.192
28.	1.33	735.	0.179
29.	1.33	736.	0.217
30.	1.318	737.	0.205
31.	1.322	738.	0.208
32.	1.318	739.	0.192
33.	1.297	740.	0.225
34.	1.301	741.	0.2
35.	1.268	742.	0.205
36.	1.28	743.	0.204
37.	1.273	744.	0.193
38.	1.252	745.	0.204
39.	1.251	746.	0.187
40.	1.222	747.	0.205
41.	1.21	748.	0.188
42.	1.193	749.	0.214
43.	1.243	750.	0.195
44.	1.202	751.	0.188
45.	1.194	752.	0.193
46.	1.194	753.	0.193
47.	1.198	754.	0.191
48.	1.206	755.	0.167
49.	1.185	756.	0.213
50.	1.19	757.	0.183
51.	1.164	758.	0.172
52.	1.168	759.	0.209
53.	1.161	760.	0.162
54.	1.16	761.	0.192
55.	1.144	762.	0.191
56.	1.143	763.	0.197
57.	1.136	764.	0.187
58.	1.11	765.	0.193
59.	1.119	766.	0.191
60.	1.119	767.	0.184
61.	1.132	768.	0.195
62.	1.11	769.	0.217
63.	1.078	770.	0.2
64.	1.099	771.	0.217
65.	1.094	772.	0.221
66.	1.099	773.	0.183
67.	1.069	774.	0.197
68.	1.078	775.	0.196
69.	1.069	776.	0.192
70.	1.045	777.	0.197
71.	1.036	778.	0.187
72.	1.024	779.	0.209
73.	1.045	780.	0.166
74.	1.045	781.	0.176
75.	1.019	782.	0.213
76.	1.007	783.	0.195
77.	1.016	784.	0.214
78.	0.995	785.	0.171

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
79.	0.991	786.	0.197
80.	1.025	787.	0.184
81.	1.008	788.	0.205
82.	1.008	789.	0.184
83.	1.008	790.	0.187
84.	0.974	791.	0.188
85.	0.987	792.	0.183
86.	0.978	793.	0.184
87.	0.97	794.	0.201
88.	0.962	795.	0.201
89.	0.958	796.	0.191
90.	0.95	797.	0.2
91.	0.954	798.	0.193
92.	0.954	799.	0.188
93.	0.945	800.	0.175
94.	0.938	801.	0.21
95.	0.949	802.	0.184
96.	0.917	803.	0.184
97.	0.933	804.	0.184
98.	0.908	805.	0.196
99.	0.926	806.	0.195
100.	0.883	807.	0.188
101.	0.908	808.	0.176
102.	0.891	809.	0.192
103.	0.88	810.	0.167
104.	0.892	811.	0.192
105.	0.884	812.	0.2
106.	0.863	813.	0.192
107.	0.883	814.	0.197
108.	0.876	815.	0.201
109.	0.859	816.	0.193
110.	0.859	817.	0.163
111.	0.834	818.	0.2
112.	0.842	819.	0.175
113.	0.842	820.	0.172
114.	0.83	821.	0.159
115.	0.854	822.	0.179
116.	0.875	823.	0.18
117.	0.855	824.	0.192
118.	0.826	825.	0.192
119.	0.83	826.	0.18
120.	0.838	827.	0.191
121.	0.838	828.	0.195
122.	0.8	829.	0.188
123.	0.809	830.	0.195
124.	0.792	831.	0.167
125.	0.817	832.	0.175
126.	0.784	833.	0.179
127.	0.784	834.	0.192
128.	0.818	835.	0.184
129.	0.801	836.	0.187
130.	0.78	837.	0.188
131.	0.789	838.	0.171
132.	0.814	839.	0.176
133.	0.764	840.	0.188
134.	0.776	841.	0.159
135.	0.763	842.	0.188

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
136.	0.751	843.	0.188
137.	0.755	844.	0.193
138.	0.743	845.	0.188
139.	0.751	846.	0.168
140.	0.76	847.	0.172
141.	0.731	848.	0.159
142.	0.764	849.	0.171
143.	0.735	850.	0.175
144.	0.743	851.	0.181
145.	0.735	852.	0.159
146.	0.718	853.	0.171
147.	0.735	854.	0.179
148.	0.726	855.	0.172
149.	0.731	856.	0.18
150.	0.714	857.	0.175
151.	0.723	858.	0.171
152.	0.719	859.	0.189
153.	0.727	860.	0.176
154.	0.714	861.	0.179
155.	0.689	862.	0.192
156.	0.706	863.	0.181
157.	0.703	864.	0.2
158.	0.71	865.	0.185
159.	0.698	866.	0.179
160.	0.689	867.	0.185
161.	0.682	868.	0.188
162.	0.694	869.	0.188
163.	0.686	870.	0.192
164.	0.69	871.	0.179
165.	0.656	872.	0.188
166.	0.69	873.	0.184
167.	0.673	874.	0.172
168.	0.673	875.	0.18
169.	0.665	876.	0.188
170.	0.665	877.	0.192
171.	0.64	878.	0.188
172.	0.657	879.	0.2
173.	0.644	880.	0.198
174.	0.653	881.	0.179
175.	0.653	882.	0.181
176.	0.661	883.	0.18
177.	0.649	884.	0.179
178.	0.645	885.	0.163
179.	0.645	886.	0.184
180.	0.64	887.	0.184
181.	0.633	888.	0.184
182.	0.637	889.	0.179
183.	0.615	890.	0.188
184.	0.619	891.	0.175
185.	0.632	892.	0.201
186.	0.599	893.	0.171
187.	0.619	894.	0.167
188.	0.628	895.	0.193
189.	0.628	896.	0.177
190.	0.599	897.	0.184
191.	0.607	898.	0.184
192.	0.603	899.	0.175

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
193.	0.603	900.	0.188
194.	0.578	901.	0.184
195.	0.603	902.	0.192
196.	0.599	903.	0.171
197.	0.603	904.	0.202
198.	0.603	905.	0.175
199.	0.603	906.	0.18
200.	0.595	907.	0.167
201.	0.586	908.	0.151
202.	0.565	909.	0.201
203.	0.578	910.	0.175
204.	0.561	911.	0.167
205.	0.574	912.	0.192
206.	0.574	913.	0.18
207.	0.565	914.	0.175
208.	0.565	915.	0.176
209.	0.586	916.	0.171
210.	0.562	917.	0.188
211.	0.57	918.	0.175
212.	0.575	919.	0.184
213.	0.558	920.	0.209
214.	0.566	921.	0.167
215.	0.579	922.	0.18
216.	0.549	923.	0.179
217.	0.558	924.	0.172
218.	0.583	925.	0.158
219.	0.562	926.	0.172
220.	0.554	927.	0.175
221.	0.541	928.	0.167
222.	0.542	929.	0.192
223.	0.533	930.	0.184
224.	0.52	931.	0.193
225.	0.533	932.	0.155
226.	0.537	933.	0.15
227.	0.537	934.	0.18
228.	0.546	935.	0.164
229.	0.554	936.	0.176
230.	0.537	937.	0.197
231.	0.547	938.	0.18
232.	0.542	939.	0.192
233.	0.521	940.	0.176
234.	0.521	941.	0.179
235.	0.504	942.	0.188
236.	0.508	943.	0.167
237.	0.52	944.	0.184
238.	0.517	945.	0.185
239.	0.513	946.	0.163
240.	0.516	947.	0.196
241.	0.512	948.	0.154
242.	0.508	949.	0.189
243.	0.496	950.	0.172
244.	0.508	951.	0.171
245.	0.504	952.	0.172
246.	0.5	953.	0.18
247.	0.491	954.	0.184
248.	0.497	955.	0.155
249.	0.517	956.	0.167

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
250.	0.48	957.	0.184
251.	0.475	958.	0.154
252.	0.491	959.	0.172
253.	0.487	960.	0.163
254.	0.509	961.	0.179
255.	0.48	962.	0.179
256.	0.5	963.	0.176
257.	0.484	964.	0.184
258.	0.513	965.	0.168
259.	0.488	966.	0.167
260.	0.476	967.	0.147
261.	0.463	968.	0.167
262.	0.488	969.	0.179
263.	0.458	970.	0.179
264.	0.467	971.	0.18
265.	0.492	972.	0.179
266.	0.451	973.	0.164
267.	0.455	974.	0.16
268.	0.467	975.	0.184
269.	0.455	976.	0.177
270.	0.488	977.	0.158
271.	0.454	978.	0.168
272.	0.446	979.	0.193
273.	0.426	980.	0.172
274.	0.434	981.	0.168
275.	0.459	982.	0.18
276.	0.463	983.	0.167
277.	0.459	984.	0.155
278.	0.447	985.	0.163
279.	0.451	986.	0.177
280.	0.459	987.	0.163
281.	0.451	988.	0.175
282.	0.447	989.	0.181
283.	0.467	990.	0.167
284.	0.442	991.	0.189
285.	0.43	992.	0.2
286.	0.451	993.	0.172
287.	0.46	994.	0.158
288.	0.434	995.	0.18
289.	0.444	996.	0.163
290.	0.447	997.	0.167
291.	0.448	998.	0.15
292.	0.438	999.	0.176
293.	0.439	1000.	0.154
294.	0.418	1001.	0.159
295.	0.421	1002.	0.171
296.	0.417	1003.	0.163
297.	0.427	1004.	0.163
298.	0.418	1005.	0.176
299.	0.421	1006.	0.179
300.	0.439	1007.	0.172
301.	0.402	1008.	0.181
302.	0.422	1009.	0.176
303.	0.414	1010.	0.167
304.	0.41	1011.	0.175
305.	0.418	1012.	0.151
306.	0.422	1013.	0.192

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
307.	0.401	1014.	0.163
308.	0.409	1015.	0.163
309.	0.422	1016.	0.175
310.	0.405	1017.	0.158
311.	0.414	1018.	0.154
312.	0.397	1019.	0.179
313.	0.43	1020.	0.171
314.	0.414	1021.	0.155
315.	0.401	1022.	0.179
316.	0.401	1023.	0.171
317.	0.405	1024.	0.171
318.	0.405	1025.	0.18
319.	0.409	1026.	0.146
320.	0.415	1027.	0.164
321.	0.41	1028.	0.155
322.	0.385	1029.	0.142
323.	0.397	1030.	0.163
324.	0.398	1031.	0.167
325.	0.398	1032.	0.16
326.	0.414	1033.	0.154
327.	0.393	1034.	0.163
328.	0.381	1035.	0.172
329.	0.377	1036.	0.151
330.	0.377	1037.	0.156
331.	0.377	1038.	0.147
332.	0.385	1039.	0.167
333.	0.381	1040.	0.171
334.	0.386	1041.	0.185
335.	0.368	1042.	0.154
336.	0.368	1043.	0.151
337.	0.402	1044.	0.18
338.	0.372	1045.	0.171
339.	0.377	1046.	0.154
340.	0.394	1047.	0.172
341.	0.377	1048.	0.167
342.	0.381	1049.	0.172
343.	0.377	1050.	0.158
344.	0.368	1051.	0.163
345.	0.365	1052.	0.184
346.	0.386	1053.	0.184
347.	0.381	1054.	0.172
348.	0.373	1055.	0.177
349.	0.369	1056.	0.154
350.	0.369	1057.	0.159
351.	0.36	1058.	0.171
352.	0.368	1059.	0.184
353.	0.372	1060.	0.167
354.	0.36	1061.	0.147
355.	0.374	1062.	0.179
356.	0.356	1063.	0.163
357.	0.353	1064.	0.163
358.	0.365	1065.	0.154
359.	0.335	1066.	0.167
360.	0.357	1067.	0.156
361.	0.353	1068.	0.163
362.	0.349	1069.	0.168
363.	0.378	1070.	0.177

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
364.	0.361	1071.	0.16
365.	0.365	1072.	0.18
366.	0.361	1073.	0.193
367.	0.344	1074.	0.155
368.	0.327	1075.	0.181
369.	0.357	1076.	0.172
370.	0.361	1077.	0.154
371.	0.361	1078.	0.159
372.	0.357	1079.	0.171
373.	0.336	1080.	0.155
374.	0.352	1081.	0.163
375.	0.353	1082.	0.172
376.	0.344	1083.	0.179
377.	0.352	1084.	0.159
378.	0.349	1085.	0.167
379.	0.34	1086.	0.167
380.	0.349	1087.	0.172
381.	0.344	1088.	0.159
382.	0.344	1089.	0.171
383.	0.348	1090.	0.154
384.	0.331	1091.	0.154
385.	0.365	1092.	0.151
386.	0.365	1093.	0.154
387.	0.319	1094.	0.163
388.	0.344	1095.	0.163
389.	0.323	1096.	0.163
390.	0.323	1097.	0.167
391.	0.323	1098.	0.146
392.	0.349	1099.	0.158
393.	0.337	1100.	0.139
394.	0.311	1101.	0.155
395.	0.327	1102.	0.147
396.	0.34	1103.	0.164
397.	0.323	1104.	0.167
398.	0.328	1105.	0.171
399.	0.332	1106.	0.147
400.	0.336	1107.	0.156
401.	0.337	1108.	0.175
402.	0.336	1109.	0.175
403.	0.315	1110.	0.171
404.	0.315	1111.	0.16
405.	0.341	1112.	0.142
406.	0.298	1113.	0.154
407.	0.328	1114.	0.179
408.	0.323	1115.	0.163
409.	0.324	1116.	0.163
410.	0.323	1117.	0.177
411.	0.286	1118.	0.154
412.	0.336	1119.	0.15
413.	0.303	1120.	0.184
414.	0.315	1121.	0.137
415.	0.333	1122.	0.172
416.	0.319	1123.	0.156
417.	0.344	1124.	0.184
418.	0.319	1125.	0.167
419.	0.303	1126.	0.172
420.	0.315	1127.	0.171

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
421.	0.32	1128.	0.167
422.	0.319	1129.	0.172
423.	0.299	1130.	0.146
424.	0.307	1131.	0.151
425.	0.311	1132.	0.171
426.	0.319	1133.	0.167
427.	0.307	1134.	0.167
428.	0.303	1135.	0.167
429.	0.311	1136.	0.16
430.	0.328	1137.	0.167
431.	0.303	1138.	0.167
432.	0.316	1139.	0.164
433.	0.307	1140.	0.16
434.	0.307	1141.	0.163
435.	0.324	1142.	0.156
436.	0.299	1143.	0.16
437.	0.311	1144.	0.147
438.	0.307	1145.	0.185
439.	0.307	1146.	0.156
440.	0.29	1147.	0.159
441.	0.291	1148.	0.177
442.	0.295	1149.	0.155
443.	0.299	1150.	0.158
444.	0.302	1151.	0.163
445.	0.303	1152.	0.158
446.	0.312	1153.	0.155
447.	0.286	1154.	0.167
448.	0.307	1155.	0.176
449.	0.278	1156.	0.154
450.	0.278	1157.	0.16
451.	0.291	1158.	0.15
452.	0.299	1159.	0.147
453.	0.299	1160.	0.151
454.	0.316	1161.	0.171
455.	0.278	1162.	0.159
456.	0.304	1163.	0.179
457.	0.303	1164.	0.159
458.	0.307	1165.	0.154
459.	0.299	1166.	0.159
460.	0.291	1167.	0.176
461.	0.295	1168.	0.154
462.	0.291	1169.	0.163
463.	0.291	1170.	0.158
464.	0.287	1171.	0.167
465.	0.279	1172.	0.158
466.	0.278	1173.	0.15
467.	0.266	1174.	0.177
468.	0.286	1175.	0.155
469.	0.274	1176.	0.156
470.	0.274	1177.	0.198
471.	0.291	1178.	0.146
472.	0.283	1179.	0.158
473.	0.286	1180.	0.159
474.	0.27	1181.	0.167
475.	0.283	1182.	0.175
476.	0.287	1183.	0.163
477.	0.266	1184.	0.176

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
478.	0.282	1185.	0.154
479.	0.274	1186.	0.175
480.	0.287	1187.	0.18
481.	0.274	1188.	0.175
482.	0.274	1189.	0.159
483.	0.257	1190.	0.175
484.	0.261	1191.	0.171
485.	0.292	1192.	0.159
486.	0.287	1193.	0.158
487.	0.278	1194.	0.176
488.	0.27	1195.	0.139
489.	0.274	1196.	0.172
490.	0.262	1197.	0.159
491.	0.303	1198.	0.163
492.	0.283	1199.	0.167
493.	0.266	1200.	0.164
494.	0.274	1201.	0.164
495.	0.279	1202.	0.151
496.	0.283	1203.	0.143
497.	0.266	1204.	0.168
498.	0.283	1205.	0.177
499.	0.279	1206.	0.143
500.	0.266	1207.	0.163
501.	0.282	1208.	0.158
502.	0.262	1209.	0.155
503.	0.286	1210.	0.168
504.	0.24	1211.	0.138
505.	0.267	1212.	0.177
506.	0.279	1213.	0.158
507.	0.263	1214.	0.16
508.	0.266	1215.	0.163
509.	0.265	1216.	0.151
510.	0.266	1217.	0.142
511.	0.267	1218.	0.137
512.	0.262	1219.	0.164
513.	0.254	1220.	0.15
514.	0.279	1221.	0.163
515.	0.266	1222.	0.151
516.	0.258	1223.	0.155
517.	0.262	1224.	0.159
518.	0.283	1225.	0.15
519.	0.286	1226.	0.159
520.	0.271	1227.	0.151
521.	0.266	1228.	0.142
522.	0.27	1229.	0.15
523.	0.254	1230.	0.147
524.	0.266	1231.	0.172
525.	0.275	1232.	0.143
526.	0.27	1233.	0.164
527.	0.237	1234.	0.155
528.	0.267	1235.	0.164
529.	0.262	1236.	0.158
530.	0.25	1237.	0.167
531.	0.27	1238.	0.167
532.	0.266	1239.	0.164
533.	0.246	1240.	0.154
534.	0.266	1241.	0.163

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
535.	0.263	1242.	0.171
536.	0.279	1243.	0.156
537.	0.249	1244.	0.155
538.	0.262	1245.	0.168
539.	0.274	1246.	0.151
540.	0.258	1247.	0.171
541.	0.263	1248.	0.138
542.	0.271	1249.	0.154
543.	0.274	1250.	0.147
544.	0.254	1251.	0.147
545.	0.263	1252.	0.167
546.	0.27	1253.	0.16
547.	0.249	1254.	0.172
548.	0.241	1255.	0.172
549.	0.241	1256.	0.151
550.	0.258	1257.	0.177
551.	0.242	1258.	0.175
552.	0.258	1259.	0.167
553.	0.254	1260.	0.155
554.	0.258	1261.	0.175
555.	0.254	1262.	0.168
556.	0.246	1263.	0.16
557.	0.241	1264.	0.164
558.	0.258	1265.	0.172
559.	0.237	1266.	0.156
560.	0.237	1267.	0.164
561.	0.241	1268.	0.16
562.	0.263	1269.	0.172
563.	0.238	1270.	0.155
564.	0.258	1271.	0.158
565.	0.25	1272.	0.167
566.	0.233	1273.	0.171
567.	0.254	1274.	0.147
568.	0.237	1275.	0.143
569.	0.251	1276.	0.158
570.	0.233	1277.	0.168
571.	0.221	1278.	0.154
572.	0.245	1279.	0.147
573.	0.228	1280.	0.167
574.	0.225	1281.	0.167
575.	0.254	1282.	0.163
576.	0.233	1283.	0.159
577.	0.245	1284.	0.155
578.	0.225	1285.	0.151
579.	0.233	1286.	0.159
580.	0.225	1287.	0.184
581.	0.25	1288.	0.151
582.	0.228	1289.	0.172
583.	0.216	1290.	0.163
584.	0.229	1291.	0.175
585.	0.25	1292.	0.16
586.	0.233	1293.	0.155
587.	0.238	1294.	0.151
588.	0.226	1295.	0.151
589.	0.241	1296.	0.163
590.	0.246	1297.	0.168
591.	0.245	1298.	0.175

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
592.	0.242	1299.	0.177
593.	0.241	1300.	0.167
594.	0.238	1301.	0.175
595.	0.228	1302.	0.167
596.	0.23	1303.	0.168
597.	0.233	1304.	0.167
598.	0.221	1305.	0.155
599.	0.22	1306.	0.151
600.	0.229	1307.	0.142
601.	0.225	1308.	0.172
602.	0.225	1309.	0.154
603.	0.229	1310.	0.138
604.	0.212	1311.	0.16
605.	0.226	1312.	0.15
606.	0.233	1313.	0.167
607.	0.225	1314.	0.164
608.	0.241	1315.	0.158
609.	0.225	1316.	0.172
610.	0.233	1317.	0.164
611.	0.246	1318.	0.192
612.	0.258	1319.	0.147
613.	0.234	1320.	0.159
614.	0.225	1321.	0.147
615.	0.241	1322.	0.167
616.	0.226	1323.	0.142
617.	0.245	1324.	0.184
618.	0.213	1325.	0.158
619.	0.224	1326.	0.177
620.	0.221	1327.	0.163
621.	0.216	1328.	0.142
622.	0.22	1329.	0.154
623.	0.214	1330.	0.139
624.	0.237	1331.	0.147
625.	0.212	1332.	0.172
626.	0.209	1333.	0.151
627.	0.233	1334.	0.15
628.	0.217	1335.	0.16
629.	0.241	1336.	0.126
630.	0.208	1337.	0.171
631.	0.213	1338.	0.176
632.	0.199	1339.	0.181
633.	0.209	1340.	0.139
634.	0.221	1341.	0.15
635.	0.195	1342.	0.143
636.	0.216	1343.	0.13
637.	0.221	1344.	0.159
638.	0.221	1345.	0.142
639.	0.203	1346.	0.164
640.	0.197	1347.	0.151
641.	0.221	1348.	0.154
642.	0.208	1349.	0.159
643.	0.188	1350.	0.137
644.	0.224	1351.	0.15
645.	0.226	1352.	0.164
646.	0.221	1353.	0.172
647.	0.225	1354.	0.156
648.	0.212	1355.	0.151

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
649.	0.214	1356.	0.147
650.	0.225	1357.	0.147
651.	0.209	1358.	0.167
652.	0.216	1359.	0.146
653.	0.229	1360.	0.15
654.	0.214	1361.	0.176
655.	0.225	1362.	0.176
656.	0.213	1363.	0.159
657.	0.212	1364.	0.167
658.	0.212	1365.	0.155
659.	0.201	1366.	0.176
660.	0.216	1367.	0.158
661.	0.212	1368.	0.159
662.	0.212	1369.	0.147
663.	0.208	1370.	0.167
664.	0.204	1371.	0.156
665.	0.191	1372.	0.138
666.	0.193	1373.	0.163
667.	0.204	1374.	0.143
668.	0.201	1375.	0.156
669.	0.209	1376.	0.154
670.	0.201	1377.	0.172
671.	0.2	1378.	0.155
672.	0.201	1379.	0.143
673.	0.2	1380.	0.158
674.	0.216	1381.	0.18
675.	0.208	1382.	0.167
676.	0.216	1383.	0.167
677.	0.209	1384.	0.151
678.	0.226	1385.	0.155
679.	0.216	1386.	0.159
680.	0.191	1387.	0.167
681.	0.208	1388.	0.164
682.	0.193	1389.	0.148
683.	0.191	1390.	0.15
684.	0.222	1391.	0.164
685.	0.2	1392.	0.159
686.	0.2	1393.	0.154
687.	0.2	1394.	0.168
688.	0.242	1395.	0.172
689.	0.193	1396.	0.163
690.	0.192	1397.	0.139
691.	0.2	1398.	0.154
692.	0.195	1399.	0.15
693.	0.216	1400.	0.159
694.	0.192	1401.	0.15
695.	0.204	1402.	0.155
696.	0.201	1403.	0.151
697.	0.217	1404.	0.142
698.	0.218	1405.	0.158
699.	0.195	1406.	0.156
700.	0.212	1407.	0.154
701.	0.216	1408.	0.172
702.	0.2	1409.	0.163
703.	0.191	1410.	0.138
704.	0.213	1411.	0.143
705.	0.195	1412.	0.146

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
706.	0.197	1413.	0.137
707.	0.191		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	6.612E-5	cm/sec
Ss	0.004673	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.04031 cm^2/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
Kr	5.912E-5	7.58E-7	+/- 1.487E-6	77.99	cm/sec
Ss	0.004673	0.0002208	+/- 0.0004333	21.16	ft^{-1}
Kz/Kr	1.	not estimated			

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 0.03604 cm^2/sec

Parameter Correlations

	Kr	Ss
Kr	1.00	-0.94
Ss	-0.94	1.00

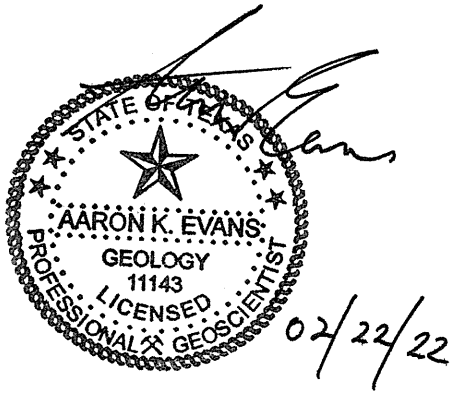
Residual Statistics

for weighted residuals

Sum of Squares... 2.281 ft^2
Variance ..... 0.001617 ft^2
Std. Deviation..... 0.04021 ft
Mean..... 0.01013 ft
No. of Residuals .. 1413
No. of Estimates .. 2

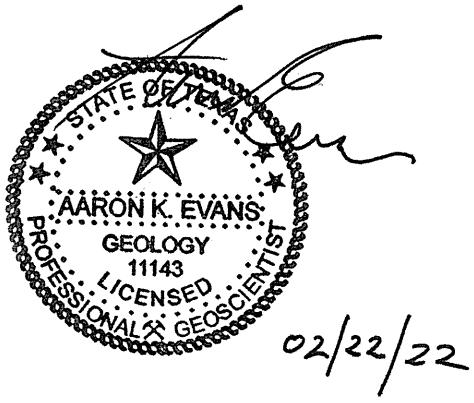
APPENDIX IIIG-E

2021 SOIL BORING PLAN AND TCEQ APPROVAL LETTER



CONTENTS

TCEQ 2021 Soil Boring Plan Approval Letter	IIIG-E-1
2021 Soil Boring Plan (Excerpts Only)	IIIG-E-2



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

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 8, 2021

Mr. Gary Bartels
Southern Region Engineer
3 Waterway Square Place, Suite 550
The Woodlands, Texas 77380

RE: Turkey Creek Landfill – Johnson County
Municipal Solid Waste – Permit No. 1417D (pending)
Proposed Site Investigation – Soil Boring Plan
Tracking No. 25987202; CN601668486/RN100825462

Dear Mr. Bartels:

On March 12, 2021 we received a soil boring plan (SBP) dated March 10, 2021, for a proposed expansion of the referenced MSW Type I landfill facility. The SBP was submitted on your behalf by Mr. Aaron Evans of Weaver Consultants Group, Fort Worth, Texas. Our review of the plan indicates that it complies with the MSW regulations. This letter constitutes approval of your plan.

The SBP proposes 12 new borings over the 25 acres expansion, for a total of 134 borings in an approximately 219.6-acre project area of which approximately 172.1 acres is being considered for waste footprint. Fifty-six of the borings have been /will be drilled to an elevation of 643.4 feet above sea level, corresponding to depths at least 5 feet below the elevation of the deepest excavation (EDE, proposed at 648.4 feet above sea level). Twenty-two borings have been /will be drilled to an elevation of 618.4 feet above sea level, corresponding to depths at least 30 feet below the EDE.

Please be advised that under Title 30 Texas Administrative Code, Chapter 330, Section 330.63(e)(4)(B), the uppermost aquifer and any hydraulically interconnected aquifers below the site must be identified, as well as the underlying confining unit. It is anticipated that this SBP, when implemented, will accurately characterize the in-situ geologic, hydrologic, and engineering properties of the surface and subsurface strata at this site. Although this plan appears to comply with the MSW regulations concerning site investigations, additional soil borings and piezometers could be required should the data generated by this SBP prove to be inconclusive. If you find it necessary to modify this approved plan, another plan detailing any proposed modifications must be submitted for approval before implementation of the modifications.

If you have questions regarding this letter, please contact me by telephone at (512) 239-2305, Mamadou.Balde@tceq.texas.gov or in writing at the address on our letterhead (please include mail code MC 124 on the first line of our address).

Sincerely,

Mamadou Balde
Municipal Solid Waste Permits Section
Waste Permits Division

MB/nck

cc: Mr. Aaron K. Evans, P.G., Weaver Consultants Group, Fort Worth

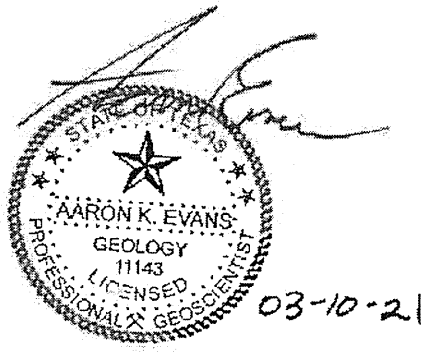
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

SOIL BORING PLAN

Prepared for

Texas Regional Landfill Company, LP

March 2021



Prepared by

Weaver Consultants Group, LLC
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9770

Project No. 0771-368-11-122-1B

Weaver Consultants Group

March 10, 2021
Project # 0771-368-11-122-1B

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

Re: Soil Boring Plan for Major Permit Amendment
Turkey Creek Landfill
TCEQ Permit No. MSW-1417D
Johnson County, Texas
RN100825462/CN600505655

Dear Mr. Goodin:

The purpose of this submittal, prepared on behalf of Texas Regional Landfill Company, LP (a wholly owned subsidiary of Waste Connections) is to provide the Texas Commission on Environmental Quality (TCEQ) with a Soil Boring Plan (SBP) in accordance with Title 30 Texas Administrative Code (TAC) §330.63(e)(4) for the referenced facility. The SBP has been prepared to support the proposed expansion of the facility's existing permitted waste disposal footprint area.

The proposed expansion includes a horizontal increase of the disposal waste footprint by approximately 25.5-acres and a vertical increase in the maximum final cover elevation by approximately 50-feet. There are no changes to be proposed to the permit boundary or elevation of deepest excavation (EDE) currently approved under TCEQ permit MSW-1417C.

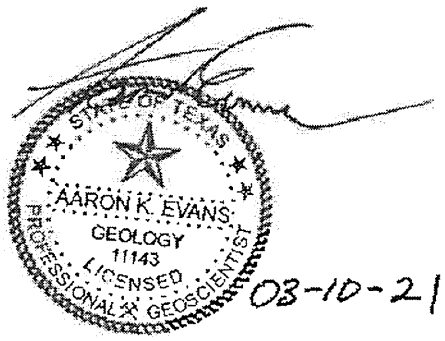
The facility's currently approved regional and site-specific geology and hydrogeology characterizations are summarized in the attached SBP. Site plan drawings depicting the currently permitted and proposed site conditions are provided in Appendix A. Site geology figures are provided in Appendix B. Historical site exploration data is provided in Appendix C. Site geotechnical data is summarized in Appendix D. Select historical groundwater contour maps of the facility are provided in Appendix E.

Two copies of this Soil Boring Plan have been provided for your use and distribution. One copy has been sent to the TCEQ Region 4 office. An electronic copy of this submittal was sent to mswper@tceq.texas.gov. A copy of this report has been placed in the facility's Site Operating Record.

6420 Southwest Boulevard • Suite 206 • Fort Worth, Texas 76109 • 817.735.9770 • wcgrp.com • Offices Nationwide

During the course of your review, if you need additional information or have any questions, please do not hesitate to call (817-735-9770).

Sincerely,
Weaver Consultants Group, LLC



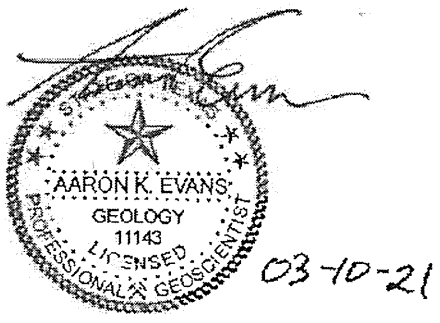
Aaron K. Evans, P.G.
Senior Hydrogeologist

Attachment: Soil Boring Plan

cc: TCEQ Region 4 Office
Gary Bartels, Texas Regional Landfill Company, LP
Site Operating Record, Turkey Creek Landfill

CONTENTS

1	**INTRODUCTION**		**1**
	1.1	Purpose	1
	1.2	Site History	1
2	**REGIONAL GEOLOGIC SETTING**		**3**
	2.1	Geologic History	3
	2.2	Regional Stratigraphy and Structure	3
	2.3	Regional Hydrogeology	5
3	**SITE-SPECIFIC GEOLOGY**		**6**
	3.1	Existing Borehole Data	6
	3.2	Site-Specific Stratigraphy	6
	3.3	Hydrogeologic Interpretation	8
	3.4	Existing Groundwater Monitoring System	8
4	**EXISTING AND PROPOSED SITE EXPLORATIONS**		**10**
	4.1	Existing Site Explorations	10
	4.2	Proposed Site Exploration	12
5	**REFERENCES**		**16**



CONTENTS (continued)

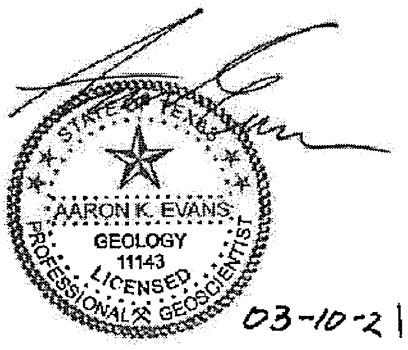
APPENDIX A – LANDFILL OVERVIEW DRAWINGS
Figure A-1 General Topographic Map
Figure A-2 Site Plan

APPENDIX B – GEOLOGY FIGURES
Figure B-1 Regional Geologic Map
Figure B-2 Regional Geologic Cross Sections
Figure B-3 Regional Woodbine Aquifer Potentiometric Surface Map
Figure B-4 Borehole and Geologic Cross Section Location Map
Figure B-5 Geologic Cross Section A-A'
Figure B-6 Geologic Cross Section B-B'
Figure B-7 Geologic Cross Section C-C'
Figure B-8 Geologic Cross Section D-D'
Figure B-9 Geologic Cross Section E-E'
Figure B-10 Geologic Cross Section F-F'

APPENDIX C – EXISTING SITE EXPLORATION DATA
Table C-1 - Summary of Existing Boring Depths and Elevations
Existing Boring Logs

APPENDIX D – EXISTING GEOTECHNICAL INFORMATION
Table D-1 – Summary of Existing Geotechnical Data

APPENDIX E - HISTORICAL GROUNDWATER CONTOUR MAPS
1995-2019 Select Groundwater Contour Maps



1 INTRODUCTION

1.1 Purpose

Waste Connections is in the process of developing a major permit amendment application for the Turkey Creek Landfill (Texas Commission on Environmental Quality (TCEQ) Permit No. MSW-1417D) which will include a horizontal and vertical expansion of the existing permitted waste disposal footprint area.

The proposed permit amendment will include two horizontal expansion areas of the facility's existing permitted disposal waste footprint as indicated on Figure A-2 – Site Plan (included in Appendix A). As indicated on Figure A-2, the two horizontal expansion areas include a western expansion area (approximately 12.8 acres) and an eastern expansion area (approximately 12.7 acres) with a total cumulative horizontal expansion area footprint of approximately 25.5 acres. The proposed permit amendment will also include a vertical expansion of the facility's existing permitted maximum final cover elevation by approximately 50-feet. The proposed expansion areas are located entirely within the existing 219.6-acre permit boundary area currently approved under Permit No. MSW-1417C. No increases to the existing permitted elevation of deepest excavation (EDE)(648.4 ft-msl) is proposed.

The following summarizes each of the drawings provided in Appendix A.

- Figure A-1 (General Topographic Map) shows the permitted landfill area on a topographic map.
- Figure A-2 (Site Plan) shows the existing site condition and delineates the currently developed and undeveloped eastern portion of Sector 11 areas and the proposed horizontal expansion areas.

1.2 Site History

The Turkey Creek Landfill is an existing Type I municipal solid waste (MSW) landfill facility located in Johnson County, approximately four miles south of the city of Alvarado, Texas; west of the intersection of county road 170 and interstate highway I35W. A summary of site permitting history is provided below:

- 1983 - The facility was permitted by the Texas Department of Health (TDH) as a 91-acre Type I MSW facility (Johnson County Sanitary Landfill, Permit No. MSW-1417) in February 1983.

- 1988 – The permit was amended to modify the fill plan and make more efficient use of available space (Permit No. MSW-1417A).
- 1991 - The permit was amended to increase the limits of waste to approximately 146.4 acres and increase the permit boundary to approximately 219.6 acres (Permit No. MSW-1417B).
- September 1994 - The permit was transferred from Johnson County Sanitary Landfill, Inc. to Laidlaw Waste Systems, Inc. (Laidlaw).
- December 1994 - The facility name was changed to Turkey Creek Landfill.
- July 1995 - A permit modification was granted by the Texas Natural Resource Conservation Commission (TNRCC) on July 7, 1995 which upgraded Permit No. MSW-1417B to comply with the Subtitle D requirements.
- May 2009 - The permit was transferred to IESI TX Landfill, LP on May 9th, 2009.
- February 2013 - A limited scope permit amendment was granted by the TCEQ on February 21, 2013 which permitted Sectors 9, 10, and 11 to accept Class 1 non-hazardous industrial waste.
- June 2016 - The permit was transferred to Waste Connections of Texas, Inc. (WCI).
- December 2019 - A permit modification was granted by the TCEQ to change the landfill ownership to Texas Regional Landfill Company, LP which is a wholly owned subsidiary of WCI.
- October 2020 - A major permit amendment was granted by the TCEQ on October 1, 2020 which increased the maximum final cover elevation from 814 ft-msl to 946 ft-msl (Permit No. MSW-1417C).

2 REGIONAL GEOLOGIC SETTING

2.1 Geologic History

Geologic formations in the site vicinity are predominately Cretaceous-age sediments. These sediments were deposited by northward advancing seas over the underlying eroded Paleozoic strata. The Cretaceous-age Comanche Series and Gulf Series sediments represent two major regional sea transgressions. Marine deposition halted toward the end of the Cretaceous period with retreat of seas gulfward, driven by regional uplifting in the west. Erosion of Cretaceous-age sediments began and continued through the Cenozoic Era to present. This erosion produced limited areas of Quaternary alluvium and terrace deposits along stream courses. The landfill is underlain by the Cretaceous-age upper Gulf and Comanche Series sediments with quaternary alluvium present at the surface near the northern and northeastern portion of the facility proximate Turkey Creek and its unnamed tributaries.

2.2 Regional Stratigraphy and Structure

Regional stratigraphy consists of Cretaceous-age Gulf Series (Eagle Ford and Woodbine formations) and Comanche Series (Washita, Fredericksburg, and Trinity group) sediments. Stratigraphic positions, general lithologic characteristics, and approximate depths and thicknesses for these groups are presented in Table 2-1 (modified from Baker et al, 1990). The Grayson Marl and Mainstreet Limestone formations (undivided) comprise the upper Washita Group sediments that underlay the Woodbine Formation in the vicinity of the landfill.

According to the Texas Bureau of Economic Geology (BEG), the site is located upon an outcrop of the Woodbine Formation as shown on the Figure B-1 – Regional Geologic Map (adapted from the BEG Geologic Atlas of Texas, Dallas Sheet, 1987) and Figure B-2 – Regional Geologic Cross Section (adapted from Nordstrom, 1982). The underlying Washita Group (Grayson Marl/Mainstreet Limestone) outcrops approximately eight miles southwest of the site at closest extent. The contact between the Woodbine and overlying Eagle Ford Formation occurs immediately south and southeast of the site permit boundary (BEG, 1987).

Table 2-1
Regional Stratigraphy in the Vicinity of Turkey Creek Landfill

Period	Series	Group or Formation	Approximate Formation Depth and (Thickness) in feet	Lithologic Characteristics and Depositional Environment
Quaternary	Holocene	Alluvium	At Surface (about 1'-33' in Site Area)	Clay, silt, sand, and gravel deposited in fluvial environment.
	Pleistocene	Terrace	At Surface (0'-50' Regionally)	Clay, silt, sand, and gravel deposited in fluvial environment.
Cretaceous	Gulfian	Austin Chalk	Outcrops East of Site (0'-700' Regionally)	Chalk, limestone, marl and occasional fine to medium sand deposited in marine environment.
		Eagle Ford	Outcrops South and East of Site (150'-280' thick Regionally)	Shale with some thin platy beds of siltstone and sandy limestone deposited in marine environment.
		Woodbine	At Surface (200' thick beneath Site)	Sand, sandstone, clay, shale, lignite deposited in fluvial and marine deltaic environments.
	Comanchian	Washita Group	200' below landfill (300' thick)	Limestone, marl, and clay; some sand near top deposited in marine environment.
		Fredericksburg Group	500' below landfill (200' thick)	Limestone, clay, marl, shale, and shell agglomerates deposited in near shore marine depositional environment.
		Trinity Group	700' below landfill (1,000 feet thick)	Fine sand, sandy shale, and shale deposited in fluvial, deltaic, and near shore marine environments.
Paleozoic	undifferentiated		1,700' below landfill	Sandstone, limestone, shale, and conglomerate.

Modified from Langley (1999) and Nordstrom (1982).

2.3 Regional Hydrogeology

Regional aquifers beneath the landfill include the Cretaceous-age Woodbine and Trinity aquifers. These aquifers are separated by approximately 500 feet of low permeability Washita and Fredericksburg group sediments and are not hydraulically connected (Harden, 2004). The Paluxy, Glen Rose, and underlying Twin Mountain formations comprise the Trinity Aquifer.

2.3.1 Woodbine Aquifer

The Woodbine Formation is classified by the Texas Water Development Board (TWDB) as a minor Texas aquifer composed of fine-grained, cross-stratified, fluvial sand interbedded with shale and clay, and some gravel (Hopkins, 1996 and Harden et al, 2004). According to Harden et al (2004), Woodbine groundwater is present under confined conditions throughout most of north Texas but may be unconfined in areas of outcrop.

The Woodbine Formation ranges in thickness from less than 100 feet in south Texas to over 600 feet in northeast Texas down-dip areas (Harden et al, 2004). The Woodbine sediments were deposited by fluvial, destructive deltaic, and strand plain depositional systems sourced from erosion of the Ouachita uplift in Oklahoma and Arkansas (BEG, 1971 and Harden et al, 2004). As noted in Figure B-3, the regional Woodbine groundwater flow direction follows the regional dip of the formation to the east-southeast. The average rate of groundwater movement is reported to be about 10 to 20 feet per year (Nordstrom, 1982). The primary source of recharge to the aquifer is precipitation infiltration on the outcrop.

2.3.2 Trinity Aquifer

From the youngest to oldest, the Trinity Aquifer is comprised of the Paluxy Formation, the Glen Rose Formation, and the Twin Mountain Formation. The TWDB classifies the Trinity Aquifer as a major Texas aquifer (Ashworth and Hopkins, 1995). According to the Harden et al (2004) and local water well logs, depth to the top of the Trinity Aquifer (top of Paluxy Formation) beneath the landfill is approximately 700 feet below ground surface (near mean sea level). The Paluxy potentiometric surface elevation beneath the site is at about 200 ft-msl indicating confined aquifer conditions (Harden et al, 2004). According to Nordstrom (1982), the Paluxy hydraulic gradient is about 27 feet per mile with groundwater flowing to the east at less than two feet per year.

According to the Harden et al (2004) and local water well logs, depth to bottom of the Trinity Aquifer (bottom of the Twin Mountains Formation) beneath the landfill is about 1600-1700 ft-bgs, or -900 to -1000 ft-msl. The Paluxy outcrops about 24 miles west of the site (BEG, 1987).

3 SITE-SPECIFIC GEOLOGY

3.1 Existing Borehole Data

The currently approved subsurface characterization of the site's permitted 146.6-acre waste footprint and 219.6-acre permit boundary is supported by 122 soil borings whose locations are shown on Figure B-4 in Appendix B. Site-specific geologic cross sections constructed from the existing boring logs and groundwater elevation data and are presented as Figures B-5 through B-10 in Appendix B. The cross section locations are provided in Figure B-4 of Appendix B and on insert maps on the individual cross section figures. The groundwater elevation data presented on these cross sections was obtained from available tabulated water level data from previous subsurface investigation reports (for the groundwater piezometers) and from the August 2010 sampling event by The Carel Corporation (for the groundwater monitoring wells only). The August 2010 event was chosen because it includes groundwater elevation data collected within a single gauging event from both the former groundwater monitoring system wells (Pre-2009) and currently approved groundwater system wells. Table C-1 in Appendix C summarizes the existing borehole data set. The individual borehole logs are also presented in Appendix C. Appendix D summarizes the existing geotechnical data.

The site completed six subsurface investigation events between 1981 and 2012, which are documented in Appendix IIIG - Geology Report of the approved Site Development Plan (Permit No. MSW-1417C). The earliest investigations were conducted by Baker-Shiflett (1981 and 1984) for the purpose of characterizing the original 91-acre landfill area. Subsequent investigations have characterized the currently permitted 219.6-acre landfill area.

3.2 Site-Specific Stratigraphy

The currently permitted site-specific subsurface geologic stratigraphic characterization of the 219.6-acre landfill unit is detailed in Appendix IIIG of the approved Site Development Plan (Permit No. MSW-1417C). Site-specific stratigraphic units include the Upper Sand unit, the Lower Sand unit, and the Bounding Shale unit. These three site-specific units overlie the Woodbine Aquifer Zone.

3.2.1 Upper Sand Unit

The uppermost site-specific lithostratigraphic unit is the Upper Sand unit. The Upper Sand is characterized as predominately loose sand, clayey sand, sandy clay, and silty clay deposits associated with alluvium and weathered Woodbine Formation sediments. These sediments exhibit a high degree of compositional heterogeneity with interbedding and abrupt to gradational transitions in material composition. Predevelopment, Upper Sand sediments ranged in thickness from 1.5 to 44 feet within the landfill permit boundary. The Upper Sand sediments within the limits of waste have since been removed by excavation from site development. The remaining Upper Sand sediments are present in the areas between the permitted limits of waste and the permit boundary. According to the existing borehole data, the Upper Sand sediments exhibit varying degrees of saturation from dry to wet. Field slug test data conducted on piezometers screened in Upper Sand unit sediments indicate a permeability of $3x10^{-4}$ cm/sec (Baker-Shiflett, 1991).

3.2.2 Bounding Shale Unit

The Bounding Shale unit underlies the Upper Sand unit throughout the site. The Bounding Shale is comprised of Woodbine Formation sediments. Sediments within this unit are predominately sandy shale, clayey shale, and silty shale commonly interbedded with thin seams and laminations of silt/siltstone and sand/sandstone, and interrupted by larger sand bodies of the Lower Sand unit. The borehole data indicate the presence of gypsum, pyrite, ferrous staining, and thin lignite and limestone seams. According to the existing borehole data, the Bounding Shale sediments exhibit varying degrees of saturation from dry to wet. Available laboratory permeability testing data for the Bounding Shale sediments indicate an arithmetic mean horizontal permeability of $3.6x10^{-6}$ cm/sec and am arithmetic mean vertical permeability of $2.3x10^{-8}$ cm/sec (Baker-Shiflett, 1991, and The Carel Corporation, 2012).

3.2.3 Lower Sand Unit

Within the Bounding Shale unit lies the Lower Sand unit. The Lower Sand is characterized as discontinuous bodies of course-grained sandy sediments bounded by, and interbedded within, the Bounding Shale unit. According to existing borehole data, the sand bodies of this unit are generally expressed as isolated lenticular lenses that coalesce in some areas and otherwise pinch-out, or grade-into, the sandy shale sediments of the Bounding Shale unit. The size of individual sand bodies varies significantly with intervals up to 25 feet thick beneath the site. According to the existing borehole data, the Lower Sand sediments are predominately moist to wet and makeup the majority of the uppermost aquifer. Field slug test data from piezometers screened within the Lower Sand unit sediments indicate a permeability range of $2x10^{-5}$ to $1x10^{-4}$ cm/sec (Baker-Shiflett, 1991) with a mean arithmetic permeability of $4.7x10^{-5}$ cm/sec.

3.2.4 Woodbine Aquifer Zone

Beneath the sediments of the site-specific Upper Sand, Bounding Shale, and Lower Sand units lies the Woodbine Aquifer zone. This zone is characterized as a sequence of course-grained saturated sediments within the basal Woodbine Formation that represents the regional Woodbine Aquifer within the vicinity of the site. According to local water well logs, this zone is predominately comprised of sand with lesser occurrences of shale and limestone. Local Woodbine water wells in the site vicinity are screened within this zone and exhibit confined aquifer conditions with potentiometric surface elevations consistent with those published by the TWDB for the regional Woodbine Aquifer. Static groundwater gauging data indicate there is approximately 60 feet of vertical hydraulic separation between the perched uppermost aquifer groundwater and the underlying Woodbine Aquifer groundwater.

3.3 Hydrogeologic Interpretation

The currently permitted site-specific subsurface hydrogeologic characterization of the 219.6-acre landfill permit boundary is detailed in Appendix IIIG of the approved Site Development Plan (Permit No. MSW-1417C). Historical groundwater potentiometric surface contour maps obtained from the facility's approved are provided in Appendix D. As indicated by these figures, groundwater in the uppermost aquifer largely mimics predevelopment surface topography and flows north and northeast towards Turkey Creek and its unnamed tributaries.

Groundwater at the site is perched within surficial alluvial and upper Woodbine Formation sediments of the site-specific Uppers Sand, Lower Sand, and Bounding Shale units. The first continuous groundwater encountered beneath the landfill occurs within the Lower Sand unit sediments and within interconnecting saturated portions of the Bounding Shale unit which collectively constitute the site-wide Uppermost Aquifer. Groundwater within the uppermost aquifer flows horizontally downgradient toward Turkey Creek and the northernmost areas of the site.

3.4 Existing Groundwater Monitoring System

The currently permitted groundwater monitoring system is detailed in Appendix IIIH - Groundwater Sampling and Analysis Plan (GWSAP) of the approved Site Development Plan (Permit No. MSW-1417C). The approved system consists of 18 groundwater monitoring wells that include two upgradient background monitor wells (MW-5B and 18), and 16 downgradient (Point of Compliance) monitor wells (MW-7, 9, 13, 15, 19, 20, 21, 27, 28, 29, 3B, 26, 30, 31, 32, and 33). In addition, two former groundwater background monitor wells (MW-16 and MW-17) exist. These two wells were part of the former groundwater monitoring system approved under permit MSW-1417B and are scheduled to be plugged and abandoned during 2021 in

accordance with the currently permitted groundwater monitoring system design (Permit No. MSW-1417C). The groundwater monitoring well locations are shown on Figures B-4 in Appendix B, and on the groundwater contour maps provided in Appendix D.

4 EXISTING AND PROPOSED SITE EXPLORATIONS

4.1 Existing Site Explorations

Subsurface conditions for the site have been determined from the results of 122 borings advanced during 19 drilling events. Seven geotechnical and/or geological subsurface exploration drilling events conducted by Baker-Shiflett (1981, 1984, 1986, 1987, 1988-1989, and 1991) and The Carel Corporation (2012) yielded 65 borings. Groundwater monitoring well and landfill gas probe installations conducted during 12 drilling events provide additional subsurface characterization data from 57 borings across the site. These borings are documented in Appendix IIIG of the currently approved Site Development Plan (Permit No. MSW-1417C). A summary of each drilling event conducted at the site is listed below:

- A 1981 subsurface investigation by Baker-Shiflett included 15 geotechnical borings (B-1 through B-16) that were drilled to evaluate subsurface conditions beneath the original 91-acre site.
- A 1983 drilling project by Baker-Shiflett included the installation of five groundwater monitor wells (MW-1 through MW-5). It is noted that no lithologic logs or well data sheets are available for these monitor wells.
- A 1984 subsurface investigation by Baker-Shiflett included four geotechnical borings (S-1 through S-4) that were drilled to further evaluate subsurface conditions of the original 91-acre site.
- A 1986 subsurface investigation by Baker-Shiflett included 15 geotechnical borings (B-16 through B-30) that were drilled to investigate deeper subsurface conditions beneath the original 91-acre site.
- A 1987 subsurface investigation by Baker-Shiflett included seven exploratory borings (A-1 through A-7) that were drilled along the southern extent of the original 91-acre site to further characterize subsurface conditions and provide additional groundwater data. Temporary groundwater piezometers were installed in four of the borings (A-4 through A-7). However, no details of their construction are available.
- A 1988-1989 subsurface investigation by Baker-Shiflett included 14 exploratory borings (B-31 through B-44) that were drilled to characterize subsurface conditions beneath the southern 135-acre (approximate) property pursuant to expanding the site to the currently permitted 226-acre area under MSW-Permit No. 1417B. Temporary groundwater piezometers were installed in 13 of the borings (B-31 through B-43).

- A 1990 drilling project by Baker-Shiflett included the installation of two groundwater monitor wells (MW-2B and MW-3B).
- A 1991 subsurface investigation by Baker-Shiflett included four exploratory borings (B-9A, 32A, 36A, and 44A) that were completed as temporary groundwater piezometers to further characterize groundwater within the Upper Sand unit.
- A 1992-1993 drilling project by EMCON included the installation of 14 groundwater monitor wells (MW-1C, MW-4B, MW-5B, and MW-6 through MW-16).
- A 1994 drilling project by CURA included the installation of three landfill gas probes (GMP-1 through GMP-3).
- A 1994 drilling project by Golder Associates included the installation of 11 landfill gas probes (GMP-4 through GMP-13 and GMP-5A).
- A 1995 drilling project by EMCON included the installation of eight groundwater monitoring wells (MW-17 through MW-23, MW-26, and MW-27).
- A 1999 drilling project by EMCON included the installation of two groundwater monitoring wells (MW-24 and MW-25).
- A 2001 drilling project by Weaver Boos and Gordon included the installation of landfill gas probe GMP-10A.
- A 2002 drilling project by The Carel Corporation included the installation of two landfill gas probes (GMP-7A and GMP-13A).
- A 2004 subsurface investigation project by Weaver Boos Consultants included the installation of temporary landfill gas monitoring probe TMP-5B.
- A 2009 drilling project by The Carel Corporation included the installation of six groundwater monitoring wells (MW-28 through MW-33).
- A 2012 subsurface investigation by The Carel Corporation included six exploratory borings (B9-1, B9-2, B10-1, B10-2, B11-1, and B12-1) that were drilled to further characterize subsurface conditions in the southeast undeveloped area pursuant to a Limited Scope Permit Amendment for the acceptance of Class 1 waste (Sectors 9-11).
- A 2013 drilling project by The Carel Corporation included the installation of landfill gas probe GMP-9A.

The existing soil boring locations are shown on Figure B-4 in Appendix B. Logs of the borings are provided in Appendix C along with a table summarizing the borehole details (Table C-1). A summary table of existing geotechnical testing data is presented in Appendix D (Table D-1). As indicated in the facility's approved Geology Report (Permit No. 1417C, SDP, Appendix IIIG, Section 3.3), based on review of the previous permit applications, geotechnical reports, and lithologic logs,

all previous soil borings appear to have been conducted in accordance with established field exploration methods in accordance with Title 30 TAC §330.63(e)(4)(C); with the exception of some boring log lithologic descriptions by Baker-Shiflett which do not indicate moisture content or groundwater encountered at time of drilling.

4.2 Proposed Site Exploration

The existing and proposed boring soil boring locations are shown on Figure B-4 in Appendix B. The site has previously received TCEQ approval of its geologic and hydrogeologic characterization based on the permitted EDE (648.4 ft-msl), top of liner plan, and 146.6-acre disposal waste footprint (TCEQ Permit No. MSW-1417C). The proposed cumulative 25.5-acre horizontal expansion and proposed 50-foot vertical increase in the maximum final cover elevation does not include changes to the currently permitted EDE and no changes to the currently approved geologic or hydrogeologic characterization are proposed.

4.2.1 Requirements by Title 30 TAC §330.63(e)(4)(B)

With the addition of the 25.5-acre cumulative proposed expansion area, the facility's total proposed disposal waste footprint will be 172.1 acres. Title 30 TAC §330.63(e)(4)(B) (Table of Borings) indicates that a minimum of 26 borings should be advanced to characterize a 172.1-acre waste management unit area, with all 26 borings drilled to a depth at least five feet deeper than the EDE and 15 of these borings drilled to a depth at least 30 feet deeper than the EDE. Previous subsurface investigations and drilling events have advanced 122 borings, of which 44 were drilled to a depth of at least five feet below the permitted EDE and 15 were drilled to a depth of at least 30 feet below the permitted EDE. Therefore, the number of previously completed borings and their depths with respect to EDE comply with the requirements of Title 30 TAC §330.63(e)(4)(B).

4.2.2 Requirements by Title 30 TAC §330.63(e)(4)(A)

Title 30 TAC §330.63(e)(4)(A) requires that a sufficient number of borings be advanced to establish subsurface stratigraphy and to determine the geotechnical properties of soils beneath the facility.

Previous subsurface investigations have advanced numerous borings located within and adjacent the proposed expansion areas including 12 borings completed to depths greater than five feet below the currently permitted EDE. The specification for these 12 borings are summarized in Table 4-1 and include five borings located in the vicinity of the western expansion area and seven borings located in the vicinity of the eastern expansion area. The information from these 12 borings will be utilized to evaluate subsurface lithologic and hydrogeological conditions in

conjunction with numerous other borings in the vicinity of the expansion areas and the totality of previously completed borings across the site.

In addition to utilizing information from the previously completed borings, 12 new borings and eight groundwater piezometer installations are proposed to investigate subsurface conditions and assess geotechnical and hydrogeological properties. The specifications for the proposed new borings are summarized in Table 4-2. As indicated, five borings are proposed to evaluate the western expansion area (PWCG-1, PWCG-2, PWCG-3, PWCG-4, and WCG-5) with piezometers installations in four borings (PWCG-1 through PWCG-4). Additionally, seven borings are proposed to evaluate the eastern expansion area (WCG-6. WCG-7, WCG-8, PWCG-9, PWCG-10, PWCG-11, and PWCG-12) with piezometer installations in four borings (PWCG-9 through PWCG-12).

Table 4-1
Previously Completed Boring Specification Summary

Boring I.D.	Original Surface Elevation (ft-msl)[1]	Boring Depth (ft-bgs)	Boring Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth Below EDE (ft)
Western Expansion Area					
B-16	672.0	50.0	622.0	648.4	26.4
B-18	666.0	60.0	606.0	648.4	42.4
B-19	669.0	50.0	619.0	648.4	29.4
MW-2B	669.5	32.5	637.0	648.4	11.4
MW-19	671.4	43.5	627.9	648.4	20.5
Eastern Expansion Area					
B-32A	702.0	92.0	610.0	648.4	38.4
B-44A	670.2	65.0	605.2	648.4	43.2
MW-9	699.1	74.0	625.1	648.4	23.3
MW-11	691.2	54.0	637.2	648.4	11.2
MW-13	682.8	48.0	634.8	648.4	13.6
MW-32	695.3	70.0	625.3	648.4	23.1
MW-33	693.4	65.0	628.4	648.4	20.0

Table 4-2
Proposed Boring Specifications

Boring I.D.	Surface Elevation (ft-msl)[1]	Boring Depth (ft-bgs)	Boring Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth Below EDE (ft)	Piezometer Completion
Western Expansion Area						
PWCG-1	675.0	56.6	618.4	648.4	30.0	Yes
PWCG-2	691.9	73.5	618.4	648.4	30.0	Yes
PWCG-3	690.0	46.6	643.4	648.4	5.0	Yes
PWCG-4	704.3	60.9	643.4	648.4	5.0	Yes
WCG-5	686.4	68.0	618.4	648.4	30.0	No
Eastern Expansion Area						
WCG-6	696.2	52.8	643.4	648.4	5.0	No
WCG-7	704.9	61.5	643.4	648.4	5.0	No
WCG-8	702.1	58.7	643.4	648.4	5.0	No
PWCG-9	696.2	77.8	618.4	648.4	30.0	Yes
PWCG-10	702.5	84.1	618.4	648.4	30.0	Yes
PWCG-11	708.6	90.2	618.4	648.4	30.0	yes
PWCG-12	705.0	86.6	618.4	648.4	30.0	Yes

[1] Surface elevations estimated from 2020 topographic contours.

4.2.3 Borehole Drilling and Piezometer Installation

The proposed borings will be drilled, continuously sampled, and completed in accordance with established field exploration methods and soil samples will be collected and tested to determine geotechnical properties of each strata in accordance with Title 30 TAC §330.63(e)(4). Representative geotechnical soil samples of each soil type encountered will be retained for geotechnical properties testing in accordance with Title 30 TAC §330.63(e)(5). The proposed groundwater piezometers will be screened within the uppermost aquifer and installed to groundwater monitoring well specifications to allow for potential future conversion to groundwater monitoring wells. Total piezometer depth will be determined at time of drilling based on lithology encountered and uppermost aquifer depth and may require drilling deeper than the boring drilling depths listed in Table 4-2. The piezometers will be utilized in conjunction with the facility's existing groundwater monitoring wells to evaluate hydrogeological conditions including potentiometric head, hydraulic gradient, and estimated flow rate of the uppermost aquifer in the vicinity of the proposed expansion areas and sitewide. Borings not completed as

groundwater piezometers will be plugged and abandoned by a licensed well driller in accordance with applicable TAC and Texas Department of Licensing and Regulation (TDLR) well plugging requirements.

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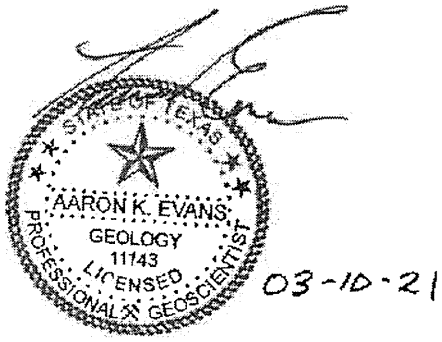
APPENDIX A

LANDFILL OVERVIEW DRAWINGS

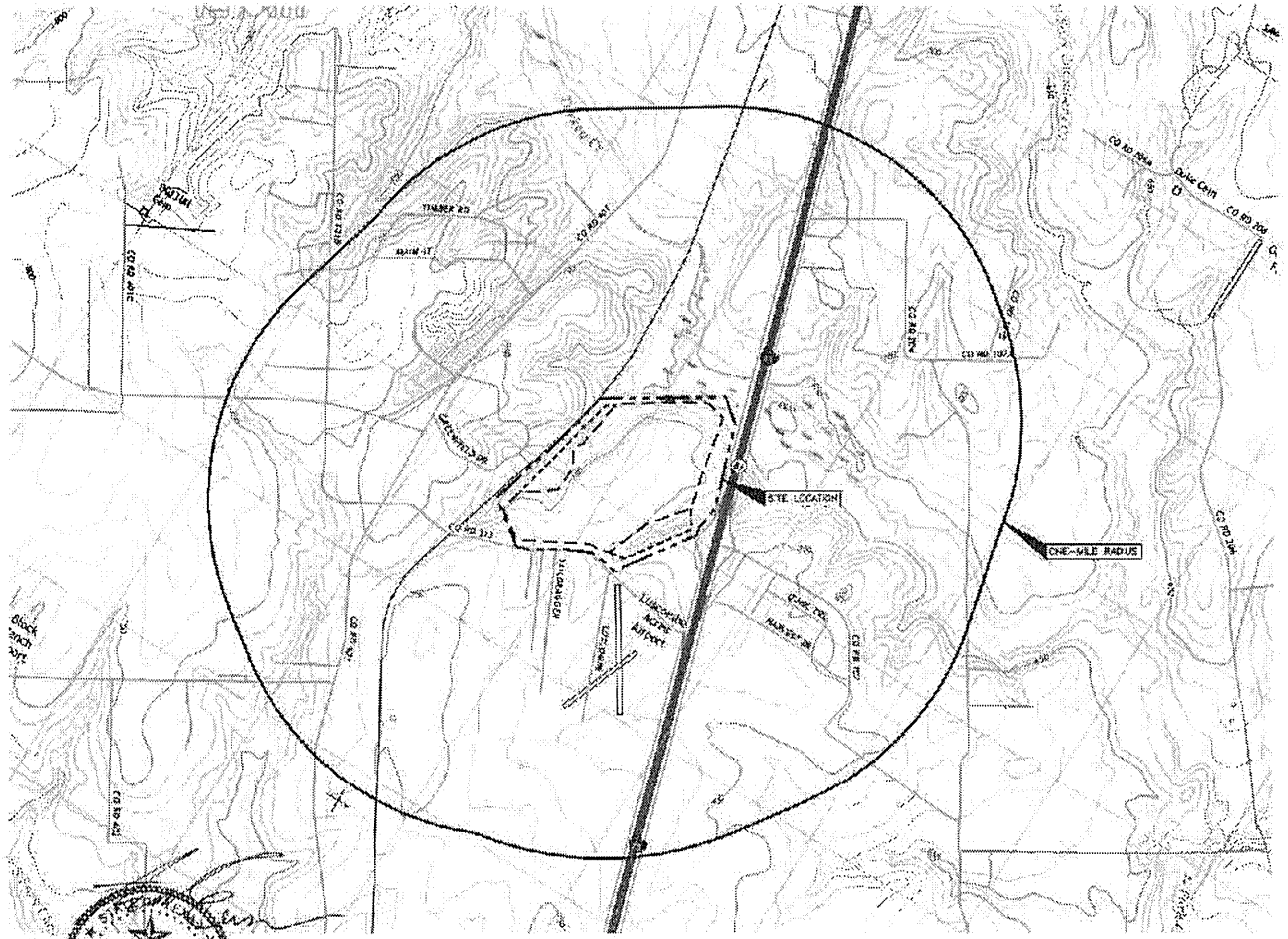


CONTENTS

FIGURES

Figure A-1 General Topographic Map
Figure A-2 Site Plan





LEGEND

PERMIT BOUNDARY

PERMITTED LIMITS OF WASTE

PROPOSED LIMITS OF WASTE

ROAD CLASSIFICATION

Expressway ..... Local Connector .....

Secondary Hwy ..... Local Road .....

Ramp 4WD

Interstate Route ..... US Route ..... State Route .....

ALVARADO, TX
2016

GRANDVIEW, TX
2016

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 14S
10 000-foot ticks: Texas Coordinate System of 1983 (north central zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery ..... NAIP, July 2014
Roads ..... U.S. Census Bureau, 2014 - 2015
Names ..... GNIS, 2015
Hydrography ..... National Hydrography Dataset, 2014
Contours ..... National Elevation Dataset, 2004
Boundaries ..... Multiple sources; see publication info 1972 - 2015

Wetlands ..... FWS National Wetlands Inventory 1977 - 2014

NOTE:
1. TOPOGRAPHIC INFORMATION REPRODUCED FROM UNITED STATES GEOLOGICAL SURVEY 7.5 MINUTE QUADRANGLE SHEETS FOR ALVARADO, TX AND GRANDVIEW, TX.

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PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

NO.	DATE	DESCRIPTION

Weaver Consultants Group
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SOIL BORING PLAN
GENERAL TOPOGRAPHIC MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE A-1

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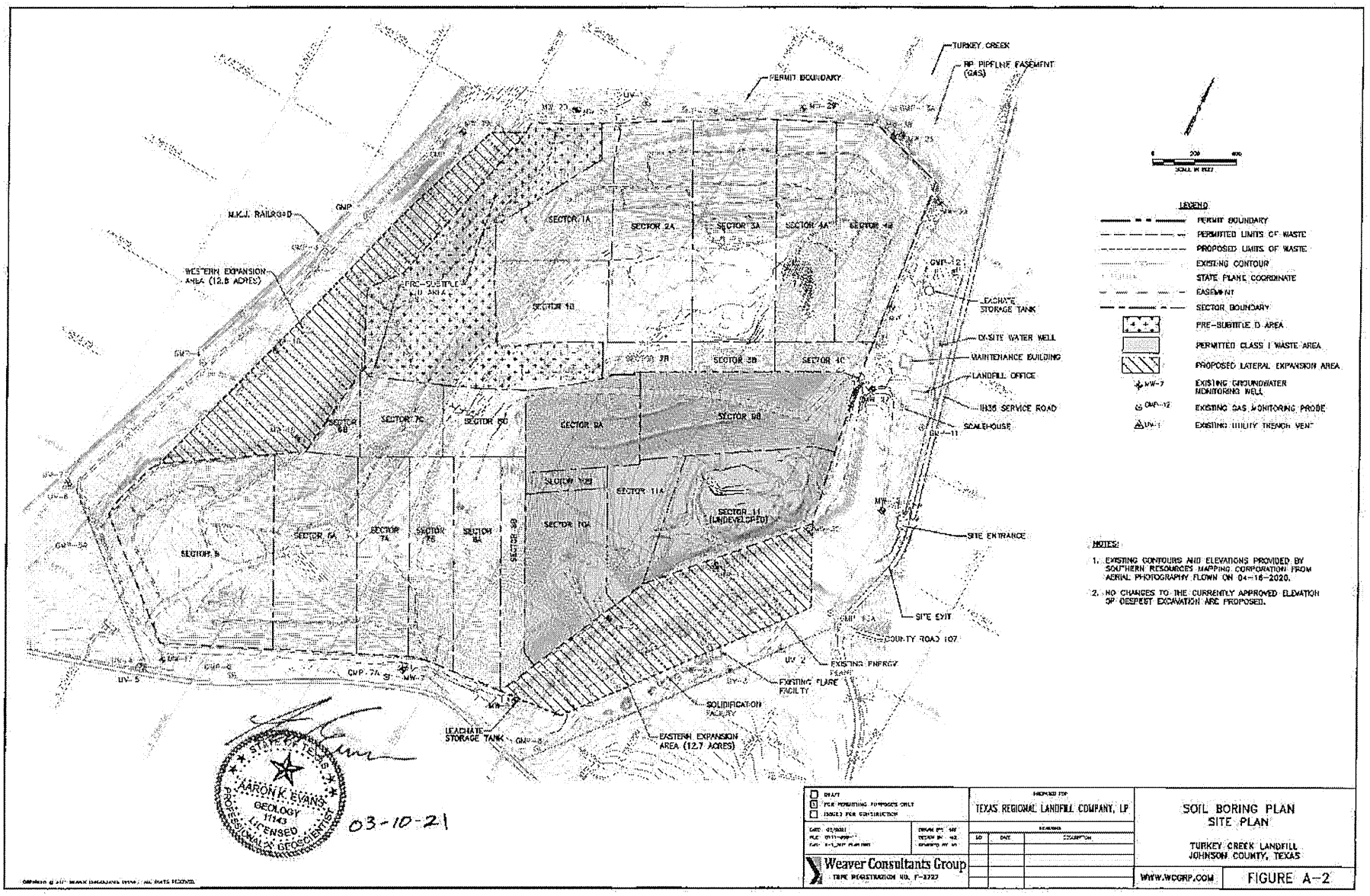
TURKEY CREEK
RP PIPELINE EASEMENT (24")
PERMIT BOUNDARY
M.K.J. RAILROAD
WESTERN EXPANSION AREA (12.8 ACRES)
PRE-SUBTITLE D AREA
SECTOR 1A
SECTOR 2A
SECTOR 3A
SECTOR 4A
SECTOR 4B
SECTOR 1B
SECTOR 2B
SECTOR 3B
SECTOR 4C
SECTOR 4B
SECTOR 7C
SECTOR 6C
SECTOR 8A
SECTOR 8B
SECTOR 10B
SECTOR 11A
SECTOR 11 (UNDEVELOPED)
SECTOR 10A
SECTOR 9
SECTOR 7A
SECTOR 7A
SECTOR 7B
SECTOR 6A
SECTOR 8B
LEACHATE STORAGE TANK
ON-SITE WATER WELL
MAINTENANCE BUILDING
LANDFILL OFFICE
1836 SERVICE ROAD
SCALEHOUSE
SITE ENTRANCE
SITE EXIT
COUNTY ROAD 107
EXISTING ENERGY PLANT
EXISTING FLARE FACILITY
SOLIDIFICATION FACILITY
EASTERN EXPANSION AREA (12.7 ACRES)
LEGEND
PERMIT BOUNDARY
PERMITTED LIMITS OF WASTE
PROPOSED LIMITS OF WASTE
EXISTING CONTOUR
STATE PLANE COORDINATE
EASEMENT
SECTOR BOUNDARY
PRE-SUBTITLE D AREA
PERMITTED CLASS 1 WASTE AREA
PROPOSED LATERAL EXPANSION AREA
EXISTING GROUNDWATER MONITORING WELL
EXISTING GAS MONITORING PROBE
EXISTING UTILITY TRENCH VENT
NOTES:
1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY SOUTHERN RESOURCES MAPPING CORPORATION FROM AERIAL PHOTOGRAPHY FLOWN ON 04-16-2020.
2. NO CHANGES TO THE CURRENTLY APPROVED ELEVATION OF DEEPEST EXCAVATION ARE PROPOSED.
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Weaver Consultants Group
TBPE REGISTRATION NO. F-3727
SOIL BORING PLAN
SITE PLAN
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
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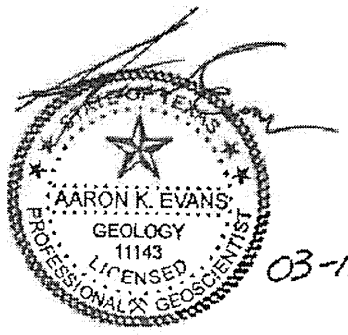
FIGURE A-2

APPENDIX B

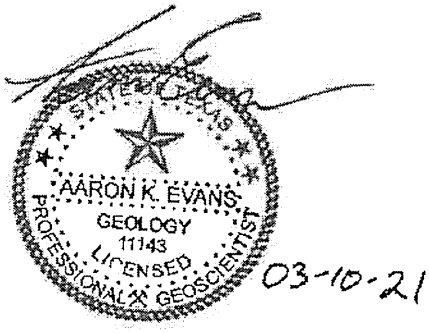
GEOLOGY FIGURES

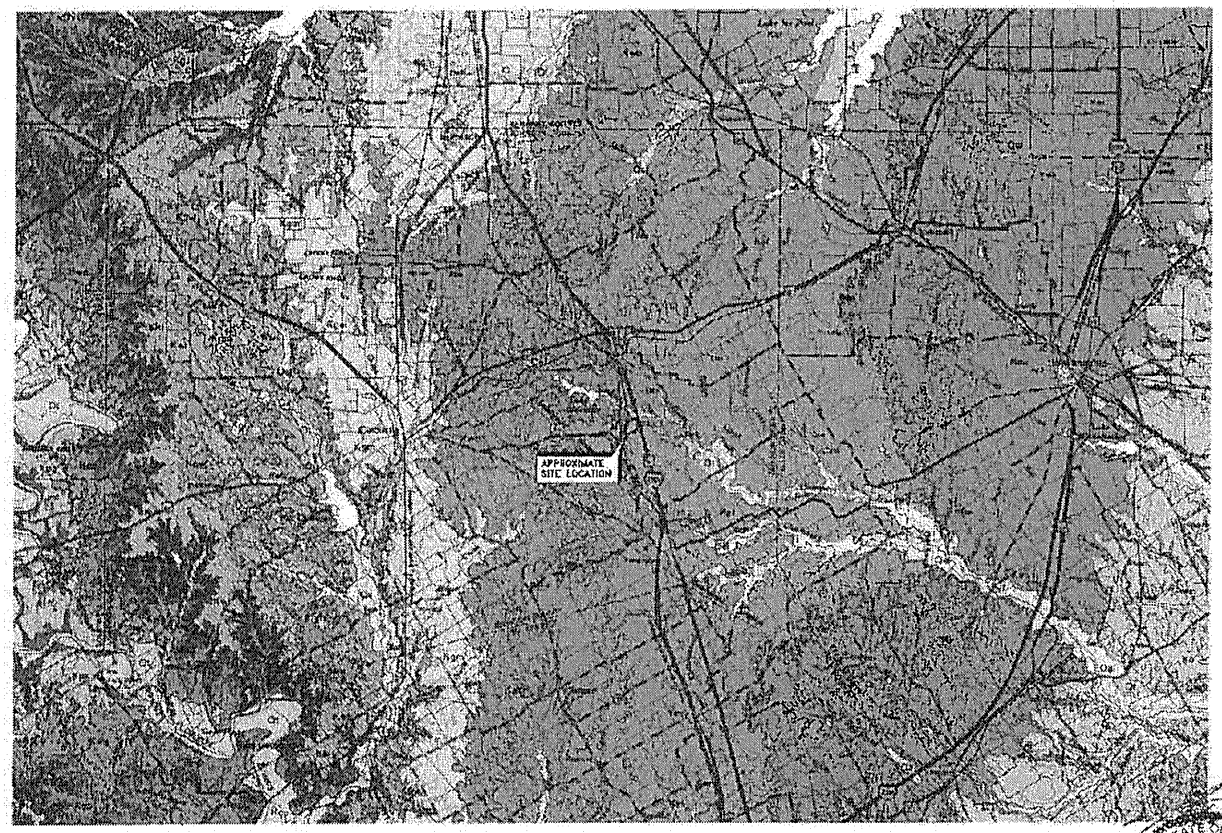


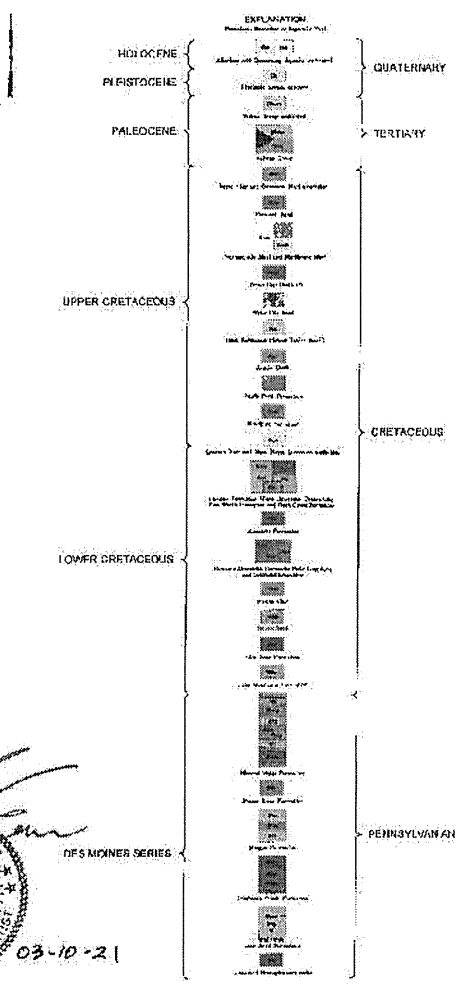
CONTENTS

FIGURES

Figure B-1	Regional Geologic Map
Figure B-2	Regional Geologic Cross Section
Figure B-3	Regional Woodbine Aquifer Potentiometric Surface Map
Figure B-4	Borehole and Geologic Cross Section Location Map
Figure B-5	Geologic Cross Section A-A'
Figure B-6	Geologic Cross Section B-B'
Figure B-7	Geologic Cross Section C-C'
Figure B-8	Geologic Cross Section D-D'
Figure B-9	Geologic Cross Section E-E'
Figure B-10	Geologic Cross Section F-F'







CONTOUR INTERVAL 50 FEET

TRANSVERSE MERCATOR PROJECTION

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GEOLOGIC ATLAS OF TEXAS, DALLAS SHEET

GAYLE SCOTT MEMORIAL EDITION

REVISED 1987

PREPARED FOR: TEXAS REGIONAL LANDFILL COMPANY, LP

Weaver Consultants Group
TBPE REGISTRATION NO.: F-3727

SOIL BORING PLAN
REGIONAL GEOLOGIC MAP

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE B-1

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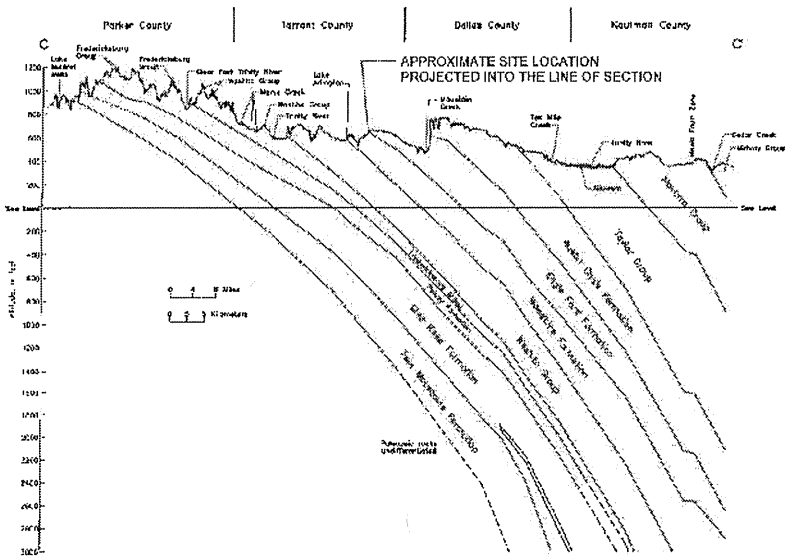

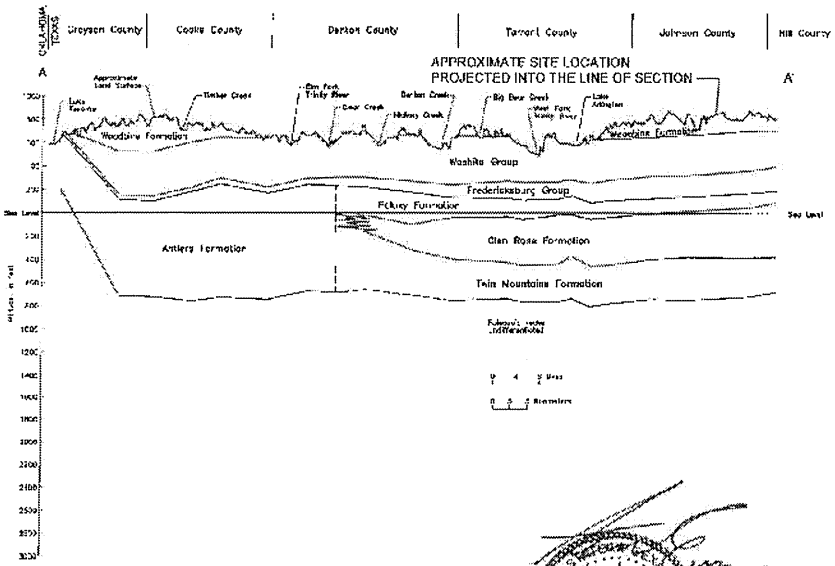

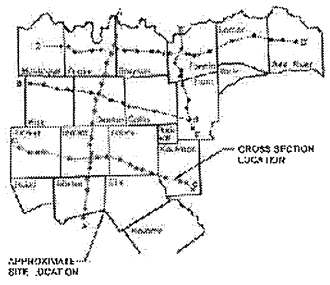

INDEX MAP
NTS

NOTE:
1. CROSS SECTIONS ADAPTED FROM NORDSTROM 1982, OCCURRENCE, AVAILABILITY, AND CHEMICAL QUALITY OF GROUNDWATER IN THE CRETACEOUS AQUIFERS OF NORTH CENTRAL TEXAS, TEXAS WATER DEVELOPMENT BOARD REPORT 269.

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SOIL BORING PLAN
REGIONAL GEOLOGIC CROSS SECTIONS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE B-2

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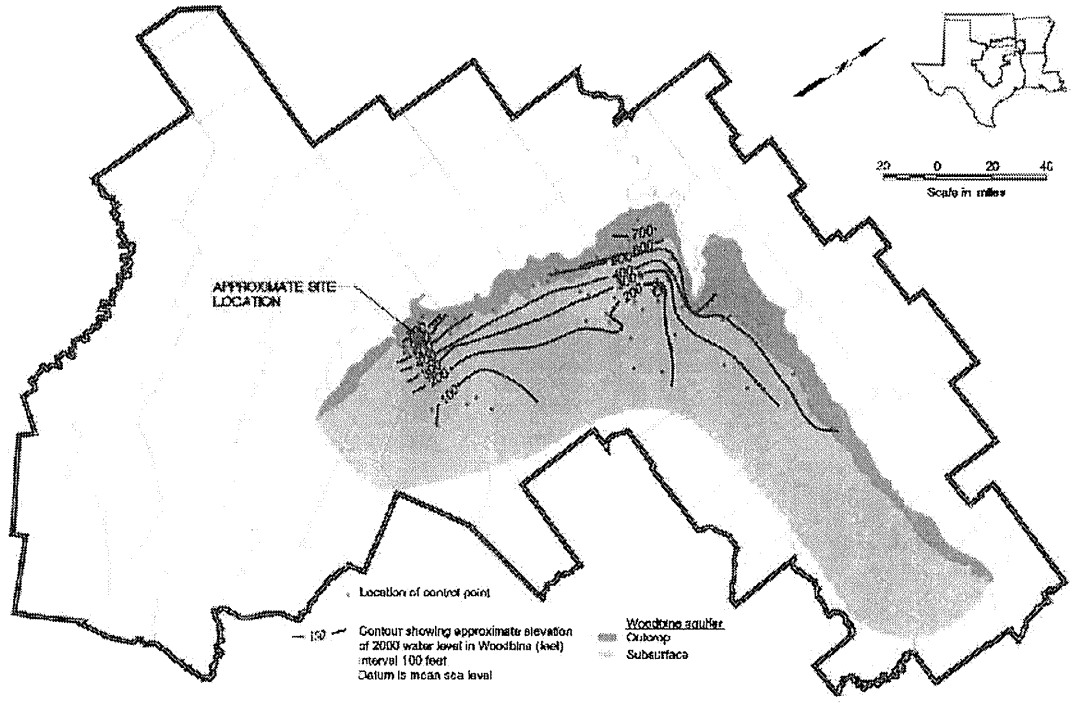

NOTES:

1. WOODBINE AQUIFER POTENTIOMETRIC SURFACE ELEVATIONS MEASURED IN 2000 BY TEXAS WATER DEVELOPMENT BOARD.
2. POTENTIOMETRIC SURFACE MAP ADAPTED FROM HARDEN ET. AL, 2004, NORTHERN TRINITY/WOODBINE AQUIFER GROUNDWATER AVAILABILITY MODEL, TEXAS WATER DEVELOPMENT BOARD.

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SOIL BORING PLAN
REGIONAL WOODBINE AQUIFER
POTENTIOMETRIC SURFACE MAP
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE B-3

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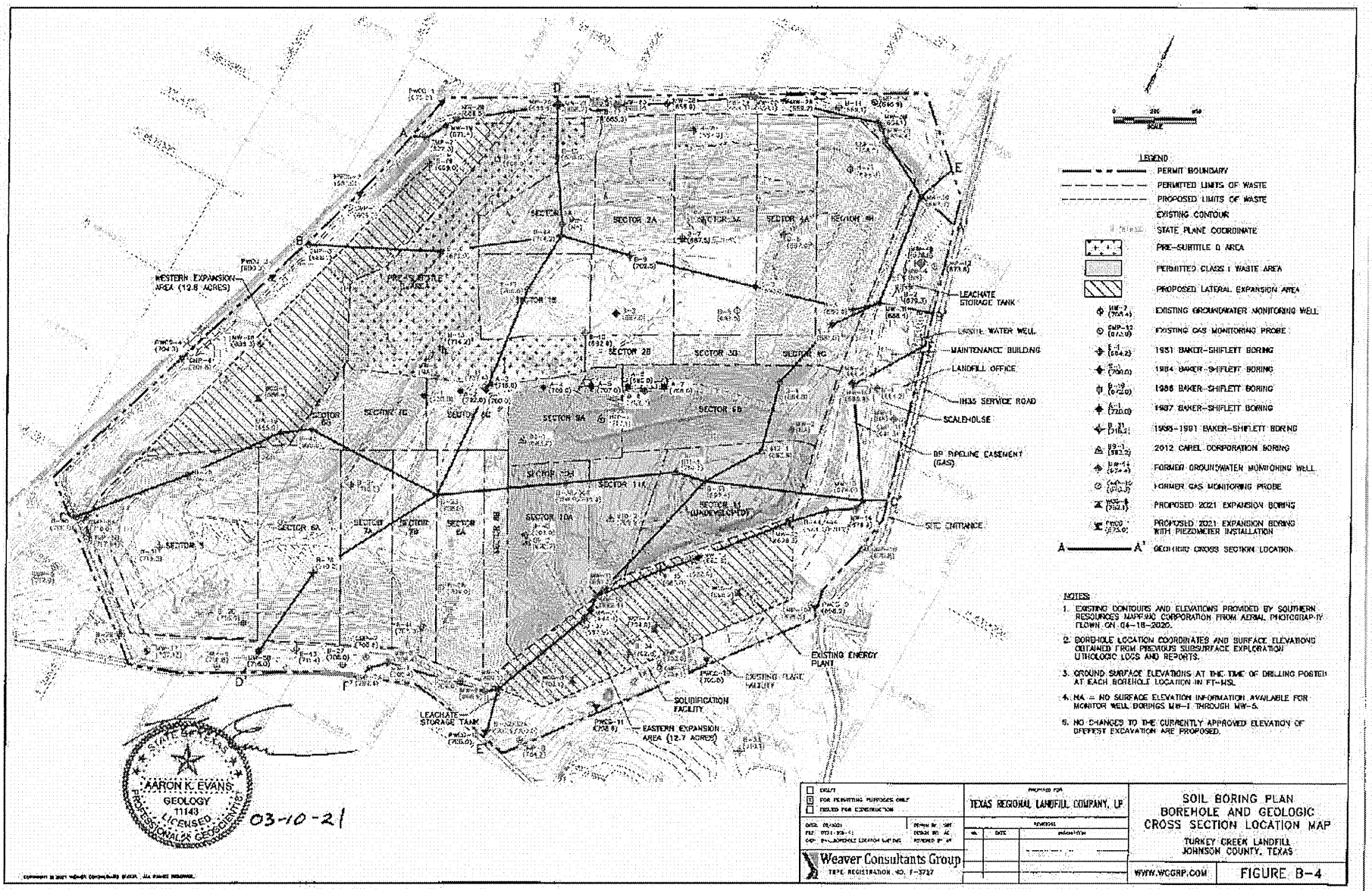
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EASTERN EXPANSION AREA (12.7 ACRES)
SECTOR 1A
SECTOR 2A
SECTOR 3A
SECTOR 4A
SECTOR 1B
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SECTOR 999B
SECTOR 1000B
LEACHATE STORAGE TANK
SOLIDIFICATION FACILITY
LEACHATE STORAGE TANK
EXISTING ENERGY PLANT
EXISTING PLANT FACILITY
ACTIVE WATER WELL
MAINTENANCE BUILDING
LANDFILL OFFICE
I-35 SERVICE ROAD
SCALEHOUSE
BP PIPELINE EASEMENT (GAS)
SITE ENTRANCE
LEGEND
PERMIT BOUNDARY
PERMITTED LIMITS OF WASTE
PROPOSED LIMITS OF WASTE
EXISTING CONTOUR
STATE PLANE COORDINATE
PRE-SUBTITLE D AREA
PERMITTED CLASS 1 WASTE AREA
PROPOSED LATERAL EXPANSION AREA
EXISTING GROUNDWATER MONITORING WELL
EXISTING GAS MONITORING PROBE
1981 BAKER-SHIFLETT BORING
1984 BAKER-SHIFLETT BORING
1986 BAKER-SHIFLETT BORING
1987 BAKER-SHIFLETT BORING
1988-1991 BAKER-SHIFLETT BORING
2012 CAREL CORPORATION BORING
FORMER GROUNDWATER MONITORING WELL
FORMER GAS MONITORING PROBE
PROPOSED 2021 EXPANSION BORING
PROPOSED 2021 EXPANSION BORING WITH PIEZOMETER INSTALLATION
GEOLOGIC CROSS SECTION LOCATION
NOTES
1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY SOUTHERN RESOURCES MAPPING CORPORATION FROM AERIAL PHOTOGRAPHY FLOWN ON 04-18-2020.
2. BOREHOLE LOCATION COORDINATES AND SURFACE ELEVATIONS OBTAINED FROM PREVIOUS SUBSURFACE EXPLORATION LITHOLOGIC LOGS AND REPORTS.
3. GROUND SURFACE ELEVATIONS AT THE TIME OF DRILLING POSTED AT EACH BOREHOLE LOCATION IN FT-MSL.
4. N.A. = NO SURFACE ELEVATION INFORMATION AVAILABLE FOR MONITOR WELL BORINGS MW-1 THROUGH MW-5.
5. NO CHANGES TO THE CURRENTLY APPROVED ELEVATION OF DEEPEST EXCAVATION ARE PROPOSED.
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PROJECTION
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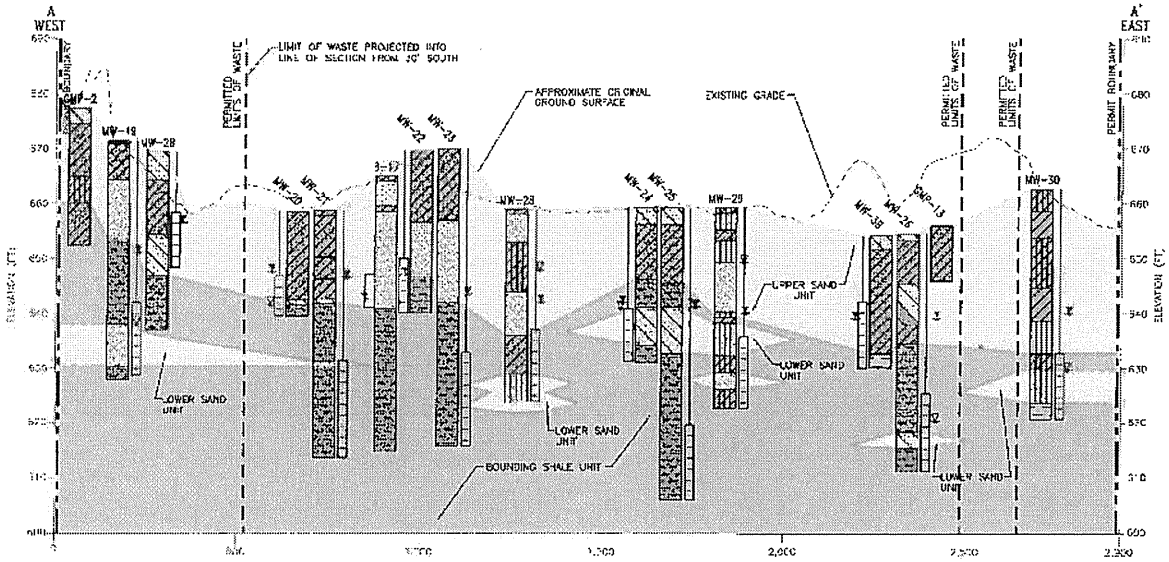
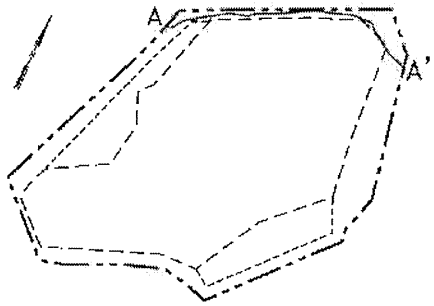
SOIL BORING PLAN
BOREHOLE AND GEOLOGIC
CROSS SECTION LOCATION MAP
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
FIGURE B-4





SECTION LOCATION MAP
NTS

LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- SANDY CLAY
- CLAYEY SAND
- SHALE or CLAYEY SHALE
- SILTY CLAY
- SANDY SHALE
- SILTY SAND
- SAND
- SILT
- CLAY
- MONITOR WELL OR PIEZOMETER WITH RISER (TOP) AND SCREENED INTERVAL (BOTTOM)
- STATIC GROUNDWATER ELEVATION (FT-MSL) FROM AUGUST 2010 GROUNDWATER MONITOR WELL GAUGING DATA (SEE NOTE 2)
- GROUNDWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
- RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE B-4.
5. PERMITTED ELEVATION OF DEEPEST EXCAVATION (EDE) IS 648.4 FT-MSL.
6. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED
7. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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SOIL BORING PLAN
GEOLOGIC CROSS SECTION A-A'

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE B-5

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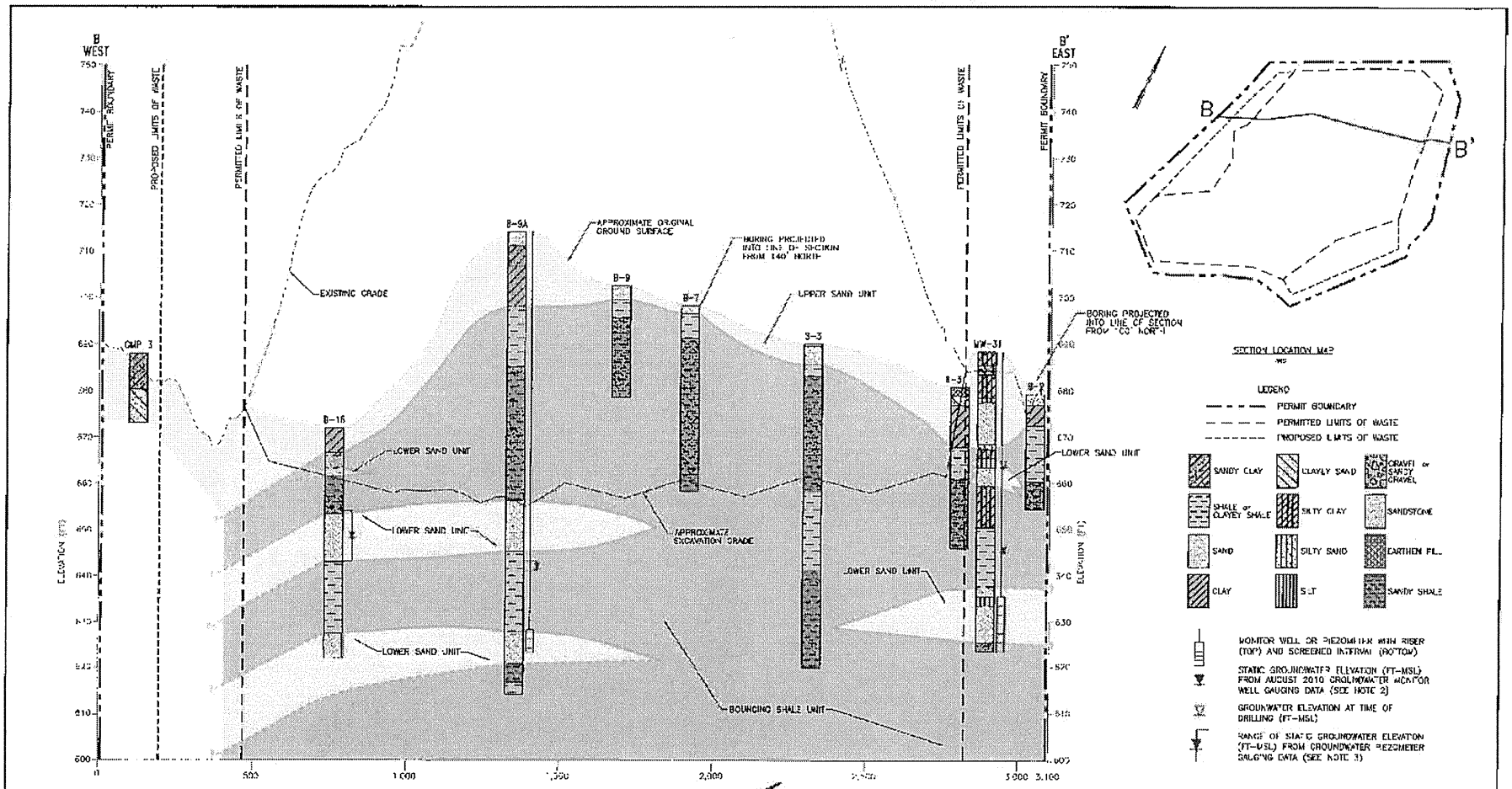

NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE GARF CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE B-4.
5. PERMITTED ELEVATION OF DEEPEST EXCAVATION (PDF) IS 648.4 FT-MSL.
6. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
7. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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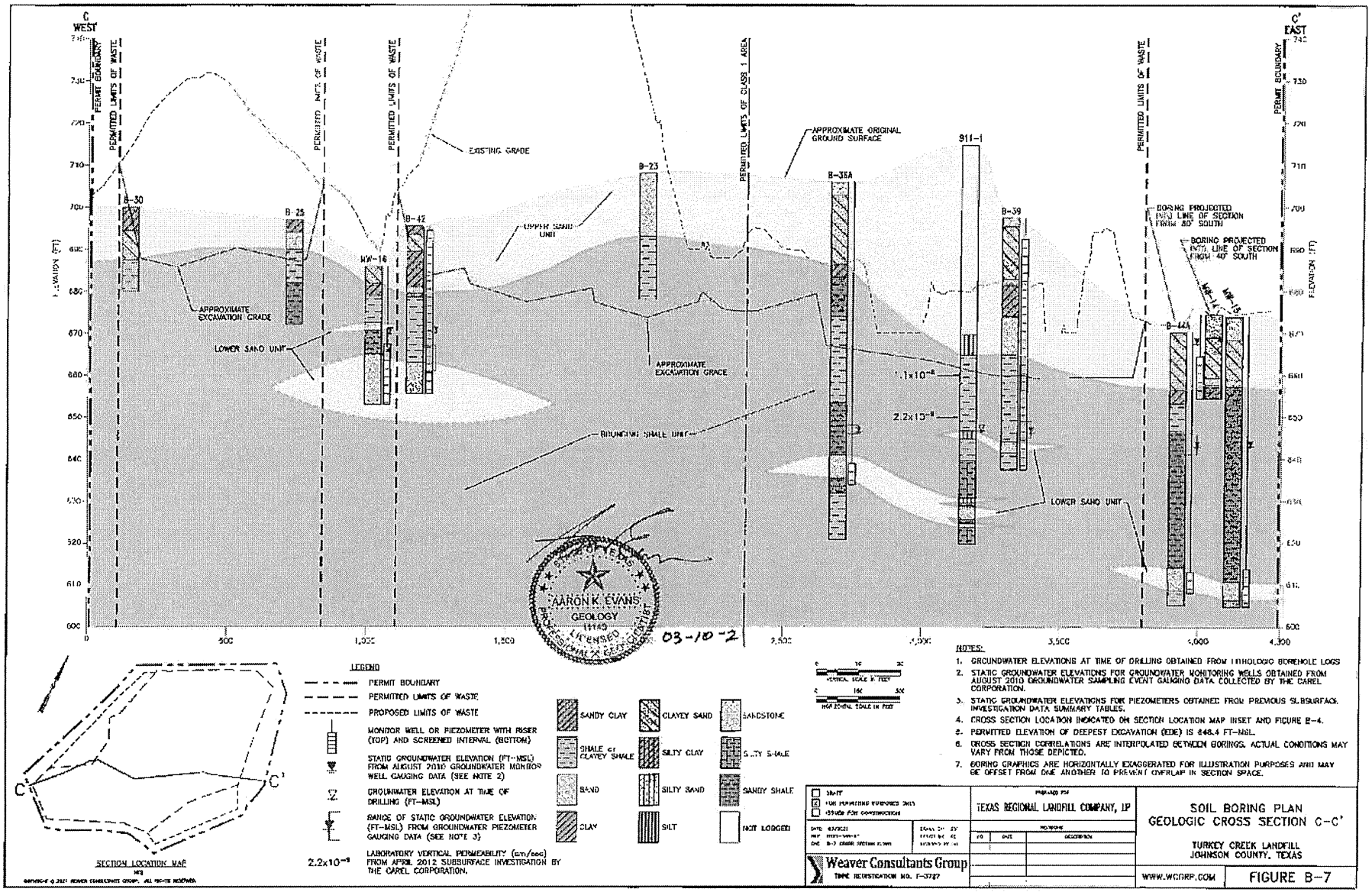
SOIL BORING PLAN
GEOLOGIC CROSS SECTION B-B'

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

FIGURE B-6


C
WEST
C'
EAST
PERMIT BOUNDARY
PERMITTED LIMITS OF WASTE
PERMITTED LIMITS OF CLASS 1 AREA
EXISTING GRADE
APPROXIMATE ORIGINAL GROUND SURFACE
APPROXIMATE EXCAVATION GRADE
UPPER SAND UNIT
LOWER SAND UNIT
BRUSHY HILL SHALE UNIT
B-30
B-25
MW-16
B-42
B-23
B-35A
911-1
B-39
B-44A
MW-15
BORING PROJECTED INTO LINE OF SECTION FROM 80' SOUTH
BORING PROJECTED INTO LINE OF SECTION FROM 40' SOUTH
1.1x10⁻⁸
2.2x10⁻⁸
ELEVATION (FT)
0
500
1,000
1,500
2,500
3,500
4,000
4,300
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SECTION LOCATION MAP
LEGEND
PERMIT BOUNDARY
PERMITTED LIMITS OF WASTE
PROPOSED LIMITS OF WASTE
MONITOR WELL OR PIEZOMETER WITH RISER (TOP) AND SCREENED INTERVAL (BOTTOM)
STATIC GROUNDWATER ELEVATION (FT-MSL) FROM AUGUST 2010 GROUNDWATER MONITOR WELL GAUGING DATA (SEE NOTE 2)
GROUNDWATER ELEVATION AT TIME OF DRILLING (FT-MSL)
RANGE OF STATIC GROUNDWATER ELEVATION (FT-MSL) FROM GROUNDWATER PIEZOMETER GAUGING DATA (SEE NOTE 3)
2.2x10⁻⁸
LABORATORY VERTICAL PERMEABILITY (cm/sec) FROM APRIL 2012 SUBSURFACE INVESTIGATION BY THE CAREL CORPORATION.
SANDY CLAY
CLAYEY SAND
SANDSTONE
SHALE or CLAYEY SHALE
SILTY CLAY
SILTY SHALE
SAND
SILTY SAND
SANDY SHALE
CLAY
SILT
NOT LOGGED
VERTICAL SCALE IN FEET
HORIZONTAL SCALE IN FEET
NOTES:
1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE B-4.
5. PERMITTED ELEVATION OF DEEPEST EXCAVATION (BDE) IS 648.4 FT-MSL.
6. CROSS SECTION CORRELATIONS ARE INTERPOLATED BETWEEN BORINGS. ACTUAL CONDITIONS MAY VARY FROM THOSE DEPICTED.
7. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.
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SOIL BORING PLAN
GEOLOGIC CROSS SECTION C-C'
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
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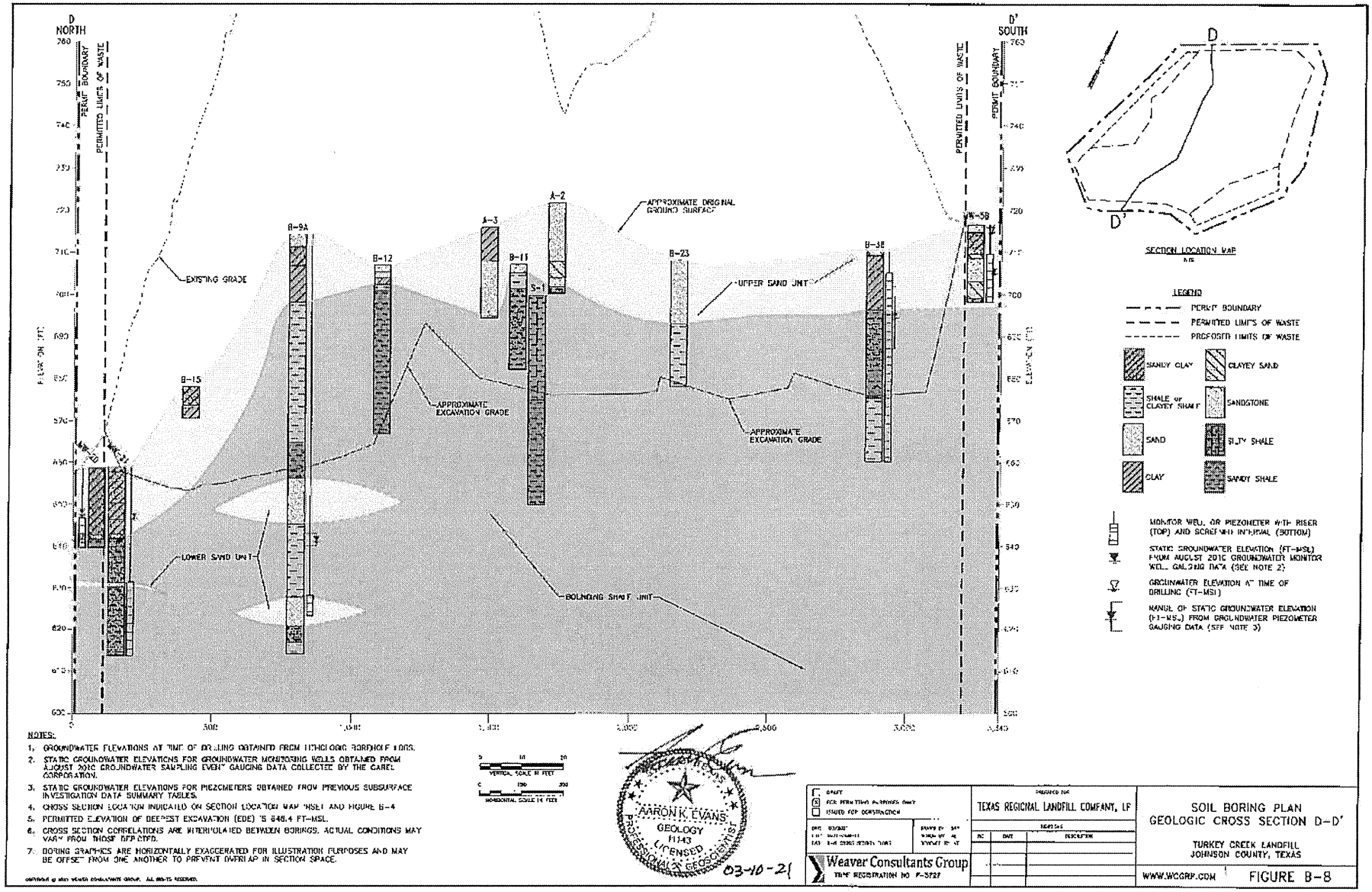
FIGURE B-7



NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
4. CROSS SECTION LOCATION INDICATED ON SECTION LOCATION MAP INSET AND FIGURE B-4
5. PERMITTED ELEVATION OF DEEPEST EXCAVATION (EDE) IS 648.4 FT-MSL.
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7. BORING GRAPHICS ARE HORIZONTALLY EXAGGERATED FOR ILLUSTRATION PURPOSES AND MAY BE OFFSET FROM ONE ANOTHER TO PREVENT OVERLAP IN SECTION SPACE.

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SOIL BORING PLAN
GEOLOGIC CROSS SECTION D-D'

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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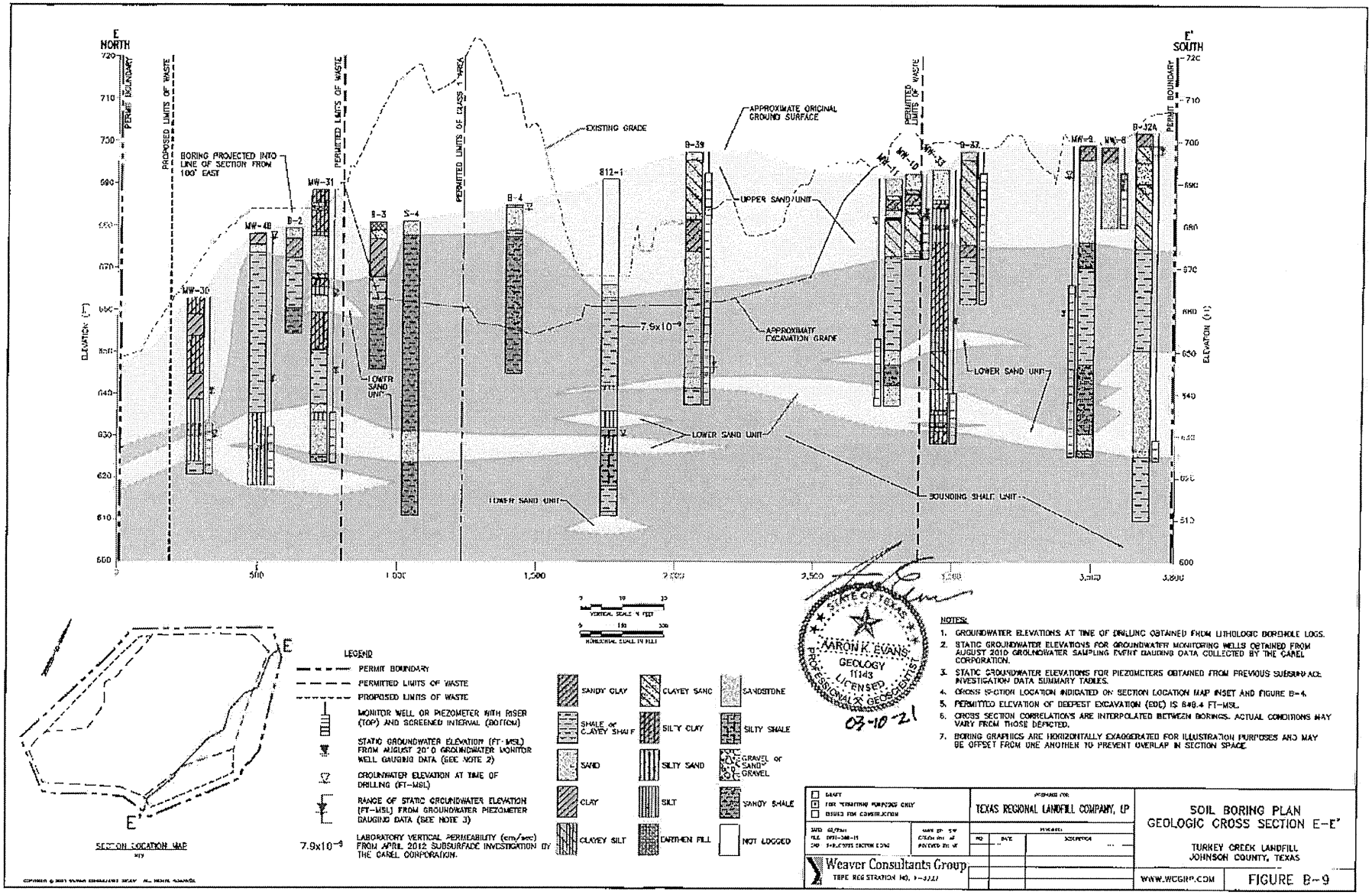
FIGURE B-8



NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
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SOIL BORING PLAN
GEOLOGIC CROSS SECTION E-E'

TURKEY CREEK LANDFILL
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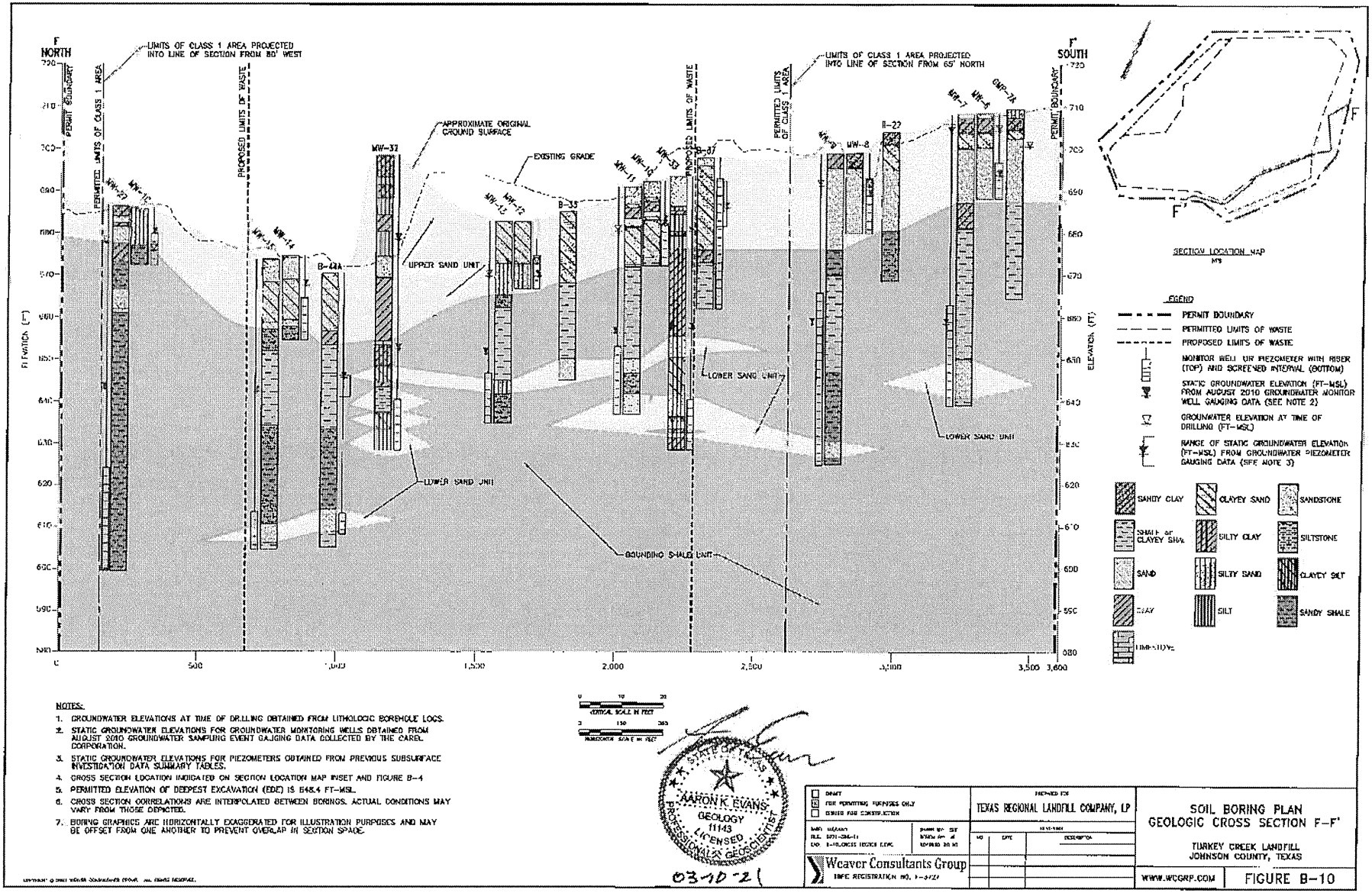
FIGURE B-9



NOTES:

1. GROUNDWATER ELEVATIONS AT TIME OF DRILLING OBTAINED FROM LITHOLOGIC BOREHOLE LOGS.
2. STATIC GROUNDWATER ELEVATIONS FOR GROUNDWATER MONITORING WELLS OBTAINED FROM AUGUST 2010 GROUNDWATER SAMPLING EVENT GAUGING DATA COLLECTED BY THE CAREL CORPORATION.
3. STATIC GROUNDWATER ELEVATIONS FOR PIEZOMETERS OBTAINED FROM PREVIOUS SUBSURFACE INVESTIGATION DATA SUMMARY TABLES.
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SOIL BORING PLAN
GEOLOGIC CROSS SECTION F-F'

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

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FIGURE B-10

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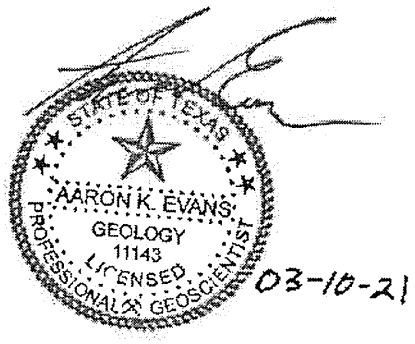
APPENDIX C

EXISTING SITE EXPLORATION DATA



CONTENTS

TABLES

Table C-1 Summary of Existing Borehole Depths and Elevations

BOREHOLE LOGS

1981 Baker-Shiflett Borehole Logs
1984 Baker-Shiflett Borehole Logs
1986 Baker-Shiflett Borehole Logs
1987 Baker-Shiflett Borehole Logs
1988-1989 Baker Shiflett Borehole Logs
1990 Baker-Shiflett Groundwater Monitoring Well Logs
1991 Baker-Shiflett Borehole Logs
1992-1993 Baker-Shiflett Groundwater Monitoring Well Logs
1994 CURA Landfill Gas Probe Logs
1994 Golder & Associates Landfill Gas Probe Logs
1995 EMCON Groundwater Monitoring Well Logs
1999 EMCON Groundwater Monitoring Well Logs
2001 Weaver Boos and Gordon Landfill Gas Probe Logs
2002 Carel Corporation Landfill Gas Probe Logs
2004 Weaver Boos Consultants Landfill Gas Probe Logs
2009 Carel Corporation Groundwater Monitoring Well Logs
2012 Carel Corporation Borehole Logs
2013 Carel Corporation Landfill Gas Probe Logs

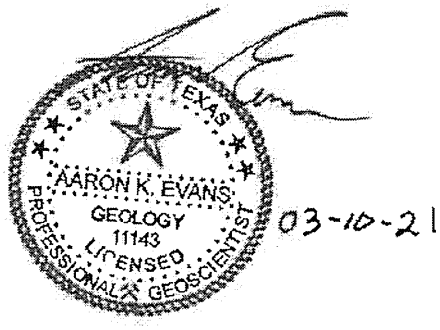


Table C-1
Summary of Existing Borehole Depths and Elevations

Borehole Number	Northing	Easting	Borehole Surface Elevation (ft-msl)	Borehole Total Depth (ft-bgs)	Borehole Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth (ft) Above or (Below) EDE[1] (ft)
1981 Borings by Baker-Shiflett, Inc.							
B-1	6815239.61	2370246.92	684.2	35.0	649.2	648.4	0.8
B-2	6815738.79	2370133.25	679.3	25.0	654.3	648.4	5.9
B-3	6815505.45	2369955.45	680.8	35.0	645.8	648.4	(2.6)
B-4	6815032.96	2369826.39	684.8	40.0	644.8	648.4	(3.6)
B-5	6815653.69	2369483.99	697.0	30.0	667.0	648.4	18.6
B-6	6815225.78	2369472.06	687.5	13.0	674.5	648.4	26.1
B-7	6815388.83	2369066.87	698.2	40.0	658.2	648.4	9.8
B-8	6814664.64	2369281.08	702.7	35.0	667.7	648.4	19.3
B-9	6815193.07	2368888.19	702.5	24.0	678.5	648.4	30.1
B-10	6814764.21	2368890.09	692.9	40.0	652.9	648.4	4.5
B-11	6814299.11	2368596.44	707.4	25.0	682.4	648.4	34.0
B-12	6814806.60	2368541.84	706.8	40.0	666.8	648.4	18.4
B-13	6814353.32	2368331.63	714.2	35.0	679.2	648.4	30.8
B-14	6816307.56	2369408.78	669.1	11.5	657.6	648.4	9.2
B-15	6815424.85	2368345.38	678.0	7.5	670.5	648.4	22.1
1983 Borings by Baker-Shiflett, Inc.							
MW-1	6815152.17	2370392.09	NA	20.0	NA	648.4	NA
MW-2	6814863.47	2369992.34	NA	30.0	NA	648.4	NA
MW-3	6815159.52	2368530.18	NA	40.0	MA	648.4	NA
MW-4	6815856.50	2370127.99	NA	30.0	NA	648.4	NA
MW-5	6814228.89	2368370.94	NA	20.0	NA	648.4	NA
1984 Borings by Baker-Shiflett, Inc.							
S-1	6814290.59	2368611.04	700	50.0	650.0	648.4	1.6
S-2	6814920.95	2368969.70	697	70.0	627.0	648.4	(21.4)
S-3	6815366.63	2369490.48	690	70.0	620.0	648.4	(28.4)
S-4	6815397.44	2369904.62	681	70.0	611.0	648.4	(37.4)

Notes: Borehole coordinates and surface elevations obtained from available lithologic logs, data forms, and site map drawings.
Borehole coordinates were converted from site-grid to NAD 83 State Plane (shown).
The permitted EDE for the entire facility is 648.4 ft-msl.
NA = No borehole elevation data are available.

Table C-1 (Continued)
Summary of Existing Borehole Depths and Elevations

Borehole Number	Northing	Easting	Borehole Surface Elevation (ft-msl)	Borehole Total Depth (ft-bgs)	Borehole Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth (ft) Above or (Below) EDE[1] (ft)
1986 Borings by Baker-Shiflett, Inc.							
B-16	6814753.19	2368084.76	672	50.0	622.0	648.4	(26.4)
B-17	6815712.54	2368408.69	665.0	50.0	615.0	648.4	(33.4)
B-18	6815268.89	2368100.48	666.0	60.0	606.0	648.4	(42.4)
B-19	6815087.17	2367829.37	669.0	50.0	619.0	648.4	(29.4)
B-20	6815859.04	2368855.80	667.0	50.0	617.0	648.4	(31.4)
B-21	6816079.32	2369606.68	669.0	50.0	619.0	648.4	(29.4)
B-22	6813018.76	2369210.17	704.0	35.5	668.5	648.4	20.1
B-23	6813736.46	2368660.94	708.0	30.0	678.0	648.4	29.6
B-24	6813572.06	2368277.77	710.0	27.5	682.5	648.4	34.1
B-25	6813223.90	2367573.39	697.0	25.0	672.0	648.4	23.6
B-26	6812739.10	2368162.32	716.0	23.0	693.0	648.4	44.6
B-27	6812803.72	2368681.95	708.0	29.5	678.5	648.4	30.1
B-28	6813360.49	2368903.32	704.0	21.0	683.0	648.4	34.6
B-29	6812395.50	2367672.94	731.0	25.0	706.0	648.4	57.6
B-30	6812772.50	2367198.77	700.0	20.0	680.0	648.4	31.6
1987 Borings by Baker-Shiflett, Inc.							
A-1	6814118.43	2368365.21	720	23.0	697.0	648.4	48.6
A-2	6814222.98	2368506.74	722.0	21.5	700.5	648.4	52.1
A-3	6814326.00	2368617.16	716.0	21.5	694.5	648.4	46.1
A-4	6814441.46	2368844.69	709.0	23.0	686.0	648.4	37.6
A-5	6814558.72	2369046.41	707.0	23.0	684.0	648.4	35.6
A-6	6814644.64	2369199.83	680.0	12.0	668.0	648.4	19.6
A-7	6814731.32	2369352.40	708.0	28.0	680.0	648.4	31.6
1988-1989 Borings by Baker-Shiflett, Inc.							
B-31	6812854.01	2367630.47	715.2	40.0	675.2	648.4	26.8
B-32	6812881.24	2369441.21	701.5	32.0	669.5	648.4	21.1
B-33	6813403.99	2370551.40	710.1	50.5	659.6	648.4	11.2
B-34	6813532.91	2369848.47	702.8	43.0	659.8	648.4	11.4

Notes: Borehole coordinates and surface elevations obtained from available lithologic logs, data forms, and site map drawings.
Borehole coordinates were converted from site-grid to NAD 83 State Plane (shown).
The permitted EDE for the entire facility is 648.4 ft-msl.
NA = No borehole elevation data are available.

Table C-1 (Continued)
Summary of Existing Borehole Depths and Elevations

Borehole Number	Northing	Easting	Borehole Surface Elevation (ft-msl)	Borehole Total Depth (ft-bgs)	Borehole Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth (ft) Above or (Below) EDE[1] (ft)
1988-1989 Borings by Baker-Shiflett, Inc. (Continued)							
B-35	6813959.98	2369781.41	685.0	40.0	645.0	648.4	(3.4)
B-36	6814095.66	2369171.41	706.0	57.0	649.0	648.4	0.6
B-37	6813578.05	2369581.94	697.9	36.0	661.9	648.4	13.5
B-38	6813112.39	2368333.06	710.2	50.0	660.2	648.4	11.8
B-39	6814440.74	2369752.30	697.4	60.0	637.4	648.4	(11.0)
B-40	6813783.18	2369127.62	707.0	60.0	647.0	648.4	(1.4)
B-41	6813149.70	2368916.10	705.3	60.0	645.3	648.4	(3.1)
B-42	6813706.38	2367977.38	695.5	40.0	655.5	648.4	7.1
B-43	6812757.87	2368446.81	711.4	60.0	651.4	648.4	3.0
B-44	6814611.77	2370334.02	673.0	18.0	655.0	648.4	6.6
1990 Borings by Baker-Shiflett, Inc.							
MW-2B	6815337.39	2367838.27	669.5	32.5	637.0	648.4	(11.4)
MW 3B	6816338.19	2369609.42	654.1	24.0	630.1	648.4	(18.3)
1991 Borings by Baker-Shiflett, Inc.							
B-9A	68515110.80	2368552.45	714.2	100.0	614.2	648.4	(34.2)
B-32A	6812881.24	2369441.21	702.0	92.0	610.0	648.4	(38.4)
B-36A	6814095.66	2369171.41	705.9	85.0	620.9	648.4	(27.5)
B-44A	6814611.77	2370334.02	670.2	65.0	605.2	648.4	(43.2)
1992-1993 Borings by EMCON Baker-Shiflett, Inc.							
MW-1C	6815197.87	2370140.31	685.8	15.0	670.8	648.4	22.4
MW-4B	6815870.01	2370129.43	678.0	60.0	618.0	648.4	(30.4)
MW-5B	6812659.52	2368293.87	716.0	18.5	697.5	648.4	49.1
MW-6	6812923.76	2368865.96	708.4	20.0	688.4	648.4	40.0
MW-7	6812922.02	2368864.72	708.4	69.0	639.4	648.4	(9.0)
MW-8	6813035.79	2369339.16	698.9	19.0	679.9	648.4	31.5
MW-9	6813075.57	2369386.29	699.1	74.0	625.1	648.4	(23.3)
MW-10	6813699.61	2369575.63	692.4	20.0	672.4	648.4	24.0
MW-11	6813738.96	2369588.67	691.2	54.0	637.2	648.4	(11.2)
MW-12	6814079.63	2369892.20	682.6	16.0	666.6	648.4	18.2

Notes: Borehole coordinates and surface elevations obtained from available lithologic logs, data forms, and site map drawings.
Borehole coordinates were converted from site-grid to NAD 83 State Plane (shown).
The permitted EDE for the entire facility is 648.4 ft-msl.
NA = No borehole elevation data are available.

Table C-1 (Continued)
Summary of Existing Borehole Depths and Elevations

Borehole Number	Northing	Easting	Borehole Surface Elevation (ft-msl)	Borehole Total Depth (ft-bgs)	Borehole Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth (ft) Above or (Below) EDE[1] (ft)
1992-1993 Borings by EMCON Baker-Shiflett, Inc. (Continued)							
MW-13	6814101.71	2369908.55	682.8	48.0	634.8	648.4	(13.6)
MW-14	6814691.89	2370453.33	674.4	20.0	654.4	648.4	6.0
MW-15	6814740.07	2370461.79	674.0	69.0	605.0	648.4	(43.4)
MW-16	6813619.98	2367855.26	685.9	33.0	652.9	648.4	4.5
1994 Borings by CURA, Inc.							
GMP-1	6814715.16	2367602.81	695.2	35.0	660.2	648.4	11.8
GMP-2	6815187.89	2367752.80	677.3	25.0	652.3	648.4	3.9
GMP-3	6814463.87	2367517.02	688.1	15.0	673.1	648.4	24.7
1994 Borings by Golder Associates, Inc.							
GMP-4	6813715.99	2367280.67	701.8	25.0	676.8	648.4	28.4
GMP-5	6812734.50	2367290.57	717.9	30.0	687.9	648.4	39.5
GMP-5A	6812517.32	2367239.38	710.0	30.0	680.0	648.4	31.6
GMP-6	6812495.28	2368160.56	716.8	10.0	706.8	648.4	58.4
GMP-7	6812893.19	2368761.13	708.2	10.0	698.2	648.4	49.8
GMP-8	6812917.95	2369601.03	704.2	20.0	684.2	648.4	35.8
GMP-9	6813574.41	2370006.30	703.8	25.0	678.8	648.4	30.4
GMP-10	6814550.56	2370590.56	670.8	10.0	660.8	648.4	12.4
GMP-11	6815167.09	2370431.29	681.3	15.0	666.3	648.4	17.9
GMP-12	6815884.27	2370191.49	673.6	20.0	653.6	648.4	5.2
GMP-13	6816286.30	2369681.58	656.2	10.0	646.2	648.4	(2.2)
1995 Borings by EMCON							
MW-17	6813389.15	2367256.18	727.3	23.5	703.8	648.4	55.4
MW-18	6813938.18	2367555.81	686.3	34.0	652.3	648.4	3.9
MW-19	6815282.85	2367805.24	671.4	43.5	627.9	648.4	(20.5)
MW-20	6815638.95	2368218.76	658.6	19.0	639.6	648.4	(8.8)
MW-21	6815645.31	2368231.48	658.7	45.0	613.7	648.4	(34.7)
MW-22	6815781.56	2368468.57	669.9	29.5	640.4	648.4	(8.0)
MW-23	6815786.01	2368479.51	669.9	54.0	615.9	648.4	(32.5)
MW-26	6816324.73	2369640.24	654.4	43.0	611.4	648.4	(37.0)

Notes: Borehole coordinates and surface elevations obtained from available lithologic logs, data forms, and site map drawings.
Borehole coordinates were converted from site-grid to NAD 83 State Plane (shown).
The permitted EDE for the entire facility is 648.4 ft-msl.
NA = No borehole elevation data are available.

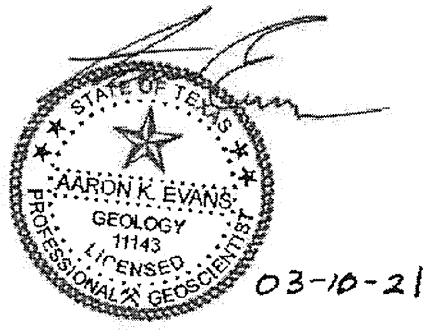
Table C-1 (Continued)
Summary of Existing Borehole Depths and Elevations

Borehole Number	Northing	Easting	Borehole Surface Elevation (ft-msl)	Borehole Total Depth (ft-bgs)	Borehole Bottom Elevation (ft-msl)	EDE (ft-msl)	Depth (ft) Above or (Below) EDE[1] (ft)
MW-27	6815204.56	2370131.67	686.4	87.0	599.4	648.4	(49.0)
1999 Borings by EMCON							
MW-24	6816139.68	2369018.45	659.3	25.6	633.7	648.4	(14.7)
MW-25	6816146.55	2369033.39	659.1	51.8	607.3	648.4	(41.1)
2001 Boring by Weaver Boos & Gordon, LLC							
GMP-10A	6814184.69	2370497.75	696.5	44.0	652.5	648.4	4.1
2002 Borings by The Carel Corporation							
GMP-7A	6812854.89	2368800.83	709.4	45.0	664.4	648.4	16.0
GMP-13A	6816412.32	2369543.29	646.9	10.0	636.9	648.4	(11.5)
2004 Boring by Weaver Boos Consultants, LLC							
TMP-5B	6812725.47	2367303.03	717.94	39.8	678.1	648.4	29.7
2009 Borings by The Carel Corporation							
MW-28	6815911.30	2368678.66	658.85	35.0	623.9	648.4	(24.6)
MW-29	6816196.70	2369170.44	659.2	36.5	622.7	648.4	(25.7)
MW-30	6816139.34	2369957.95	662.7	42.0	620.7	648.4	(27.7)
MW-31	6815590.63	2370014.13	688.4	65.0	623.4	648.4	(25.0)
MW-32	6814466.92	2370203.61	698.3	70.0	628.3	648.4	(20.1)
MW-33	6813628.99	2369587.28	693.4	65.0	628.4	648.4	(20.0)
2012 Borings by The Carel Corporation							
B9-1	6814168.43	2368889.53	683.2	45.0	638.2	648.4	(10.2)
B9-2	6813753.83	2369151.13	679.7	45.0	634.7	648.4	(13.7)
B10-1	6814445.18	2369167.43	717.1	90.0	627.1	648.4	(21.3)
B10-2	6814055.23	2369445.36	709.9	75.0	634.9	648.4	(13.5)
B11-1	6814407.08	2369607.07	714.7	95.0	619.7	648.4	(28.7)
B12-1	6814702.63	2369914.28	690.9	80.0	610.9	648.4	(37.5)
2013 Boring by The Carel Corporation							
GMP-9A	6813551.12	2370019.17	704.1	36.0	668.1	648.4	19.7

Notes: Borehole coordinates and surface elevations obtained from available lithologic logs, data forms, and site map drawings.
Borehole coordinates were converted from site-grid to NAD 83 State Plane (shown).
The permitted EDE for the entire facility is 648.4 ft-msl.
NA = No borehole elevation data are available.

APPENDIX D

EXISTING GEOTECHNICAL INFORMATION

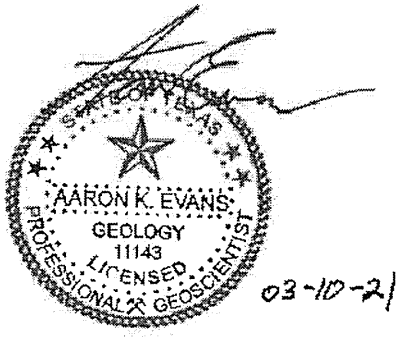


CONTENTS

SUMMARY

TABLES

Table D-1 Summary of Existing Geotechnical Data



SUMMARY

Geotechnical testing has been performed on 62 of the 122 boreholes completed at or near the site. The historical geotechnical testing data are provided in Table D-1 and includes all laboratory testing, field slug tests data, and field blow count data. Field pocket penetrometer readings are also included for the test intervals corresponding to other conducted laboratory and/or field geotechnical testing. The provided geotechnical data was obtained from various geotechnical and groundwater characterization reports for the site which were sufficient to support the design for the currently permitted 146.6-acre landfill waste footprint.

Table D-1
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Upper Sand Unit Sediments												
1981 Borings by Baker-Shiflett, Inc.												
B-3	1.5 - 2.5	-	-	-	99	18	116	-	-	-	4.5	-
B-4	4.5 - 5.5	51	13	38	-	-	-	-	-	-	-	-
B-5	1.5 - 2.5	30	11	19	71	28	-	-	-	-	3	-
B-8	1.5 - 3.0	-	-	-	42	-	-	-	-	-	4.5+	
B-8	15.0 - 16.0	-	-	-	-	-	-	-	-	-	-	7
B-9	0.0 - 1.5	-	-	-	10	-	-	-	-	-	-	-
1986 Borings by Baker-Shiflett, Inc.												
B-16	1.5 - 3.0	55	22	33	93	-	-	-	-	-	4.5	-
B-16	6.0 - 7.0	57	23	34	98	-	-	-	-	-	4.5+	-
B-16	9.0 - 10.0	-	-	-	-	-	-	-	-	-	-	50/2"
B-16	13.5 - 15.0	45	18	27	84	-	-	-	-	-	4.00	-
B-16	19.0 - 20.0	-	-	-	-	-	-	-	-	-	-	50/3"
B-16	23.0 - 24.0	-	-	-	-	-	-	-	-	-	-	50/4"
B-17	5.0 - 6.5	-	-	-	97	-	-	-	-	-	-	44
B-17	7.0 - 8.5	-	-	-	-	-	-	-	-	-	-	50/5"
B-17	8.5 - 10.0	-	-	-	-	-	-	-	-	-	-	50/5"
B-17	14.0 - 15.0	-	-	-	-	-	-	-	-	-	-	50/2"
B-17	1.5 - 3.0	29	13	16	68	-	-	-	-	-	4.5+	38
B-18	3.0 - 4.5	34	13	21	58	-	-	-	-	-	4.5+	-
B-18	7.0 - 8.5	-	-	-	53	-	-	-	-	-	4.5+	35
B-18	13.5 - 15.0	-	-	-	27	-	-	-	-	-	-	11
B-19	0 - 1.5	-	-	-	-	-					-	5
B-19	3.5 - 9.0	58	20	38	89	-	-	-	-	-	4.5	-
B-19	8.0 - 9.5	-	-	-	92	-	-	-	-	-	2.5	60
B-20	1.5 - 3.0	20	17	3	42	-	-	-	-	-	4.5+	-
B-20	7.5 - 9.0	52	21	31	88	-	-	-	-	-	4.5+	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Upper Sand Unit Sediments (Continued)												
1986 Borings by Baker-Shiflett, Inc. (Continued)												
B-20	12.5 - 14.0	-	-	-	32	-	-	-	-	-	-	-
B-20	18.5 - 19.5	-	-	-	52	-	-	-	-	-	-	-
B-21	4.5 - 6.0	56	21	35	94	-	-	-	-	-	4.0	-
B-21	7.5 - 9.0	58	22	36	-	-	-	-	-	-	4.5	-
B-21	13.5 - 15.0	52	20	32	-	-	-	-	-	-	4.5+	-
B-22	3.0 - 3.5	45	13	32	48	-	-	-	-	-	4.5	-
B-22	6.0 - 7.5	-	-	-	30	-	-	-	-	-	4.5	-
B-23	0.0 - 1.5	-	-	-	10	-	-	-	-	-	-	-
B-23	8.0 - 10.0	-	-	-	10	-	-	-	-	-	-	-
B-24	0.0 - 1.5	-	-	-	52	-	-	-	-	-	2.5	-
B-24	4.5 - 6.0	62	18	44	98	-	-	-	-	-	4.5+	-
B-25	0.0 - 1.5	-	-	-	65	-	-	-	-	-	4.5+	-
B-25	1.5 - 3.0	-	-	-	97	-	-	-	-	-	4.5+	-
B-26	0.0 - 1.5	-	-	-	46	-	-	-	-	-	2	-
B-26	1.5 - 3.0	46	23	23	-	-	-	-	-	-	4.5	-
B-26	6.0 - 7.5	-	-	-	26	-	-	-	-	-	3	-
B-26	10.5 - 12.0	-	-	-	43	-	-	-	-	-	4.5	-
B-27	4.5 - 6.0	-	-	-	41	-	-	-	-	-	2	-
B-27	15.5 - 16.5	-	-	-	50	-	-	-	-	-	4.5	-
B-27	18.5 - 20.0	34	14	20	-	-	-	-	-	-	4.5	-
B-28	1.5 - 3.0	-	-	-	18	-	-	-	-	-	-	-
B-28	7.0 - 8.5	-	-	-	42	-	-	-	-	-	4.5+	-
B-29	0.0 - 1.5	-	-	-	4	-	-	-	-	-	4.5	-
B-29	1.5 - 3.0	46	22	24	46	-	-	-	-	-	4.5	-
B-29	18.5 - 19.5	-	-	-	78	-	-	-	-	-	4.5	-
B-30	0.0 - 1.5	-	-	-	70	-	-	-	-	-	4.5	-
B-30	1.5 - 3.0	72	23	49	-	-	-	-	-	-	4.5	-
B-30	6.0 - 7.5	-	-	-	63	-	-	-	-	-	4.5+	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Upper Sand Unit Sediments (Continued)												
1988-1989 Borings by Baker-Shiflett, Inc.												
B-31	3.0 - 3.5	65	18	47	87	17	112	-	-	-	4.5	-
B-31	4.5 - 6.0	63	23	40	95	23	103	-	-	-	4.5	-
B-32	0.0 - 1.5	45	18	27	63	20	97	-	-	-	2	-
B-32	3.0 - 4.5	37	14	23	39	16	113	-	-	-	3	-
B-33	2.5 - 4.0	50	20	30	48	-	-	-	-	-	4.5+	-
B-33	4.0 - 4.5	30	21	9	27	-	-	-	-	-	4.5+	-
B-34	1.5 - 2.5	21	16	5	19	-	-	-	-	-	4.5+	-
B-35	3.0 - 4.5	NON-PLASTIC			21	6	102	-	-	-	3.5	-
B-35	7.5 - 8.4	26	13	13	23	-	-	-	-	-	4.5	-
B-35	14.1 - 14.8	22	18	4	41	-	-	-	-	-	-	-
B-36	3.0 - 4.5	NON-PLASTIC			20	16	-	-	-	-	3	-
B-36	8.0 - 8.7	30	16	14	21	-	-	-	-	-	-	-
B-37	3.0 - 4.5	42	19	23	39	12	-	-	-	-	4.5+	-
B-37	9.0 - 10.0	20	14	6	30	-	-	-	-	-	4.5+	-
B-37	13.5 - 14.8	29	13	16	37	11	-	-	-	-	4.5+	-
B-37	22.8 - 23.2	28	16	12	76	-	-	-	-	-	-	-
B-38	1.5 - 3.0	67	23	44	63	25	99	-	-	-	2.5	-
B-38	7.0 - 8.0	36	13	23	62	10	121	-	-	-	4.5+	-
B-42	6.0 - 7.5	62	20	42	97	18	-	-	-	-	4.5+	-
B-42	16.4 - 16.7	27	13	14	60	-	-	-	-	-	4.5+	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Upper Sand Unit Sediments (Continued)												
1992-1993 Borings by Baker-Shiflett, Inc.												
MW-1C	3.0 - 4.0	-	-	-	83	7						
MW-1C	7.5 - 8.5	-	-		93	11						
MW-5B	15.0 - 16.0				84							
MW-5B	16.5 - 17.5		-			18						
MW-7	21.0 - 22.0	45	18	27	25							
MW-8	2.0 - 3.0	45	14	31	45	15						
MW-8	16.0 - 17.0	-		-	92	24						
MW-9	2.0 - 3.0	45	14	31	45	15	108					
MW-9	16.0 - 17.0				92	24						
MW-12	6.0 - 7.0	23	15	8	79	18						
MW-12	13.5 - 14.5				45	16						
MW-13	6.0 - 7.0	23	16	8	79	18						
MW-13	13.0 - 14.0			-	45	16						
MW-16	5.0 - 6.0	36	13	23	45	10						

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Bounding Shale Unit Sediments												
1981 Borings by Baker-Shiflett, Inc.												
B-1	10.0 - 11.0	42	18	24	82	24	-	-	-	-	2.5	-
B-1	15.0 - 16.5	-	-	-	-	20	108	3.80E-08	-	4.59	4.5+	-
B-2	4.5 - 5.5	-	-	-	-	-	-	2.70E-07	-	-	4.5	-
B-3	5.5 - 7.5	-	-	-	-	16	-	-	-	-	4	-
B-3	8.5 - 10.0	59	20	39	-	-	-	-	-	-	3	-
B-3	15.0 - 16.5	-	-	-	-	24	103	-	-	1.19	3.5	-
B-3	26.5 - 27.5	-	-	-	-	16	124	-	-	-	-	-
B-3	27.5 - 28.5	-	-	-	-	17	121	-	-	-	-	-
B-3	32.5 - 33.0	-	-	-	-	15	120	-	-	-	-	-
B-3	33.0 - 34.0	-	-	-	-	15	123	-	-	-	-	-
B-4	6.5 - 8.0	-	-	-	-	23	99	-	-	0.99	-	3
B-5	5.5 - 6.5	-	-	-	-	20	109	-	-	-	4.5+	-
B-5	9.0 - 10.5	-	-	-	-	25	-	5.90E-06	5.60E-08	-	3.5	-
B-5	15.0 - 15.5	57	20	37	-	-	-	-	-	-	4.5+	-
B-6	9.0 - 10.0	50	20	30	63	-	-	-	-	-	4.5+	-
B-7	4.0 - 5.5	50	13	37	-	-	-	-	-	-	2	
B-7	8.0 - 9.0	-	-	-	-	-	-	-	-	-	-	4
B-8	20 - 21	-	-	-	-	-	-	7.30E-07	-	-	4.5+	-
B-9	5.0 - 5.75	-	-	-	-	-	-	4.50E-09	-	-	4.5+	-
B-9	8.0 - 9.0	-	-	-	-	15	116	-	-	1.54	4.5+	-
B-9	23.0 - 24.0	-	-	-	-	-	-	-	-	-	-	1
B-10	3.0 - 4.0	51	15	36	89	15	-	-	-	-	4.5	-
B-10	4.0 - 5.0	-	-	-	-	-	-	5.30E-08			4.5	
B-10	15.0 - 15.5	-	-	-	-	15	123	-	-	-	4.5+	-
B-10	24.5 - 25.0	-	-	-	77	-	-	-	-	-	-	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Bounding Shale Unit Sediments (Continued)												
1981 Borings by Baker-Shiflett, Inc. (Continued)												
B-11	2.0 - 3.0	38	15	23	61	18	-	-	-	-	4.5	-
B-11	6.0 - 7.0	-	-	-	-	23	106	-	-	0.83	-	
B-11	10.0 - 11.0	-	-	-	-	-	-	-	-	-	-	3.5
B-12	5.0 - 5.5	31	14	17	74	20	-	-	-	-	4.5+	-
B-12	10.0 - 11.0	-	-	-	-	-	-	-	-	2.28	3.5	-
B-12	15.0 - 15.5	59	22	37	-	-	-	2.00E-07	-	-	4.5+	-
B-12	34.0 - 35.0	-	-	-	84	-	-	-	-	-	-	-
B-13	10.0 - 10.5	48	12	36	82	18	114	-	-	2.19	4.5+	-
B-13	15.0 - 15.5	-	-	-	-	21	116	-	-	5.39	4.5+	-
B-14	4.5 - 6.0	-	-	-	-	-	-	-	-	-	3.5	-
B-14	7.5 - 9.0	-	-	-	-	-	-	-	-	-	3	-
1986 Borings by Baker-Shiflett, Inc.												
B-16	29.0 - 30.0	-	-	-	-	-	-	-	-	-	-	50/2"
B-16	37.4 - 38.0	47	21	26	97	-	-	-	-	-	-	-
B-17	25.2 - 26.2	26	13	13	63	-	-	-	-	-	-	50/5"
B-18	20.0 - 21.5	35	17	18	82	-	-	-	-	-	4.5	25
B-18	37.3 - 38.0	45	19	26	99	-	-	-	-	-	-	-
B-19	26.3 - 26.8	38	18	20	99	-	-	-	-	-	-	-
B-20	30.0 - 31.0	45	19	26	98	-	-	-	-	-	-	-
B-21	47.0 - 47.5	33	14	19	-	-	-	-	-	-	-	-
B-23	17.0 - 18.5	48	19	29	-	-	-	-	-	-	-	-
B-24	10.5 - 11.5	-	-	-	93	-	-	-	-	-	4.5+	-
B-25	7.0 - 8.5	58	22	36	-	-	-	-	-	-	4.5+	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Bounding Shale Unit Sediments (Continued)												
1988-1989 Borings by Baker-Shiflett, Inc.												
B-31	12.0 - 13.5	55	21	34	74	21	104	-	-	-	4.5	-
B-31	21.2 - 22.0	51	18	33	100	-	-	-	-	-	-	-
B-31	36.5 - 37.2	46	17	29	98	-	-	-	-	-	-	-
B-32	30.5 - 31.4	53	20	33	96	17	116	-	-	-	-	-
B-33	47.6 - 48.6	67	21	46	100	20	115	-	-	-	-	-
B-34	30.6 - 31.5	29	13	16	95	17	128	-	-	-	-	-
B-34	32.8 - 33.6	45	17	28	96	-	-	-	-	-	-	-
B-34	36.1 - 37.3	55	21	34	100	18	-	-	-	-	-	-
B-35	21.6 - 22.9	53	19	34	100	-	-	-	-	-	-	-
B-35	31.4 - 32.0	47	19	28	96	16	119	-	-	-	-	-
B-36	23.6 - 24.5	34	13	21	66	-	-	-	-	-	-	-
B-36	35.4 - 36.0	25	15	10	92	-	-	-	-	-	-	-
B-36	41.4 - 42.4	58	21	37	100	18	116	-	-	-	-	-
B-37	31.3 - 32.0	58	22	36	100	19	127	-	-	-	-	-
B-38	14.2 - 14.7	38	14	24	75	-	-	-	-	-	4.5	-
B-38	21.2 - 21.6	42	15	27	83	-	-	-	-	-	-	-
B-38	38.7 - 39.3	50	19	31	100	-	-	-	-	-	-	-
B-40	29.7 - 30.3	56	19	37	98	-	-	-	-	-	-	-
B-40	44.7 - 46.0	43	14	29	83	13	130	-	-	-	-	-
B-41	20.7 - 21.3	50	16	34	94	-	-	-	-	-	-	-
B-41	31.7 - 32.8	57	22	35	99	-	-	-	-	-	-	-
B-41	37.0 - 37.4	50	20	30	97	-	-	-	-	-	-	-
B-42	19.5 - 20.0	49	17	32	93	-	-	-	-	-	-	-
B-42	25.5 - 25.8	28	13	15	83	-	-	-	-	-	-	-
B-43	21.2 - 21.8	33	14	19	88	16	120	-	-	-	-	-
B-43	41.1 - 41.8	58	19	38	89	14	126	-	-	-	-	-
B-43	52.1 - 52.8	55	21	34	99	-	-	-	-	-	-	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Bounding Shale Unit Sediments (Continued)												
1992-1993 Borings by EMCON Baker-Shiflett, Inc.												
MW-1C	11.0 - 12.0	34	14	20	38	18	-	-	-	-	-	-
MW-1C	12.5 - 13.5	46	19	27	16	19	-	-	-	-	-	-
MW-4B	27.5 - 28.5	54	22	32	1	-	-	-	-	-	-	-
MW-7	52.0 - 53.0	46	18	28	26	-	-	-	-	-	-	-
MW-7	67.5 - 68.5	38	15	23	4	-	-	-	-	-	-	-
MW-9	24.0 - 25.0	39	16	23	22	26	-	-	-	-	-	-
MW-9	31.0 - 32.0	46	18	28	6	25	-	-	-	-	-	-
MW-9	44.0 - 45.0	28	16	12	51	20	-	-	-	-	-	-
MW-9	56.0 - 57.0	-	-	-	5	16	-	-	-	-	-	-
MW-9	72.5 - 73.5	29	14	15	25	19	-	-	-	-	-	-
MW-10	19.0 - 20.0	39	14	25	2	-	-	-	-	-	-	-
MW-11	19.0 - 20.0	39	14	25	2	-	-	-	-	-	-	-
MW-11	45.0 - 46.0	-	-	-	20	-	-	-	-	-	-	-
MW-13	18.0 - 19.0	32	14	18	10	16	-	-	-	-	-	-
MW-13	27.0 - 28.0	58	23	35	1	19	-	-	-	-	-	-
MW-13	35.0 - 36.0	46	17	29	5	14	-	-	-	-	-	-
MW-13	41.0 - 42.0	-	-	-	16	13	-	-	-	-	-	-
MW-13	44.0 - 45.0	27	14	13	17	14	-	-	-	-	-	-
MW-14	17.5 - 18.5	34	15	19	4	-	-	-	-	-	-	-
MW-15	16.7 - 17.2	34	15	19	4	-	-	-	-	-	-	-
MW-15	53.5 - 54.5	46	18	28	26	-	-	-	-	-	-	-
MW-15	68.0 - 69.0	38	15	23	4	-	-	-	-	-	-	-
MW-16	12.0 - 13.0	59	20	39	3	18	-	-	-	-	-	-
MW-16	18.5 - 19.5	44	14	30	10	17	-	-	-	-	-	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Bounding Shale Unit Sediments (Continued)												
2012 Borings by The Carel Corporation												
B9-1	11.0 - 12.0	59	24	35	0.6	-	116	-	1.40E-08	-	-	-
B9-2	12.0 - 13.0	58	23	35	0.1	-	109	-	5.70E-09	-	-	-
B10-1	58.5 - 60.0	41	15	26	29.6	-	116	-	7.80E-08	-	-	-
B10-1	65.0 - 66.0	57	21	36	7.9	-	117	-	1.90E-09	-	-	-
B10-2	50.0 - 52.0	33	15	18	3.4	-	115	-	3.00E-08	-	-	-
B11-1	55.0 - 57.0	61	22	39	0.4	-	117	-	1.10E-08	-	-	B4
B11-1	65.0 - 66.0	56	23	33	4.4	-	117	-	2.20E-09	-	-	-
B12-1	35.0 - 36.0	61	21	40	0.2	-	110	-	7.90E-09	-	-	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

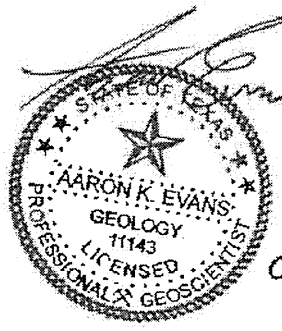
Boring Number	Depth (ft-bgs)	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Testing on Lower Sand Unit Sediments												
1988-1989 Borings by Baker-Shiflett, Inc.												
B-35	37.4 - 37.9	30	13	17	38	-	-	-	-	-	-	-
B-42	32.5 - 32.8	45	17	28	89	-	-	-	-	-	-	-
1991 Borings by Baker-Shiflett, Inc.												
B-36A	66.0 - 71.0	-	-	-	-	-	-	2.00E-05	-	-	-	-
B-42	30.0 - 40.0	-	-	-	-	-	-	2.00E-05	-	-	-	-
B-44A	57.0 - 62.0	-	-	-	-	-	-	1.00E-04	-	-	-	-
1992-1993 Borings by EMCON Baker-Shiflett, Inc.												
MW-4B	47.5 - 48.5	25	22	3	90	-	-	-	-	-	-	-
MW-4B	51.2 - 52.2	35	15	20	33	-	-	-	-	-	-	-
MW-5B	6.0 - 6.9	29	15	14	92	17	-	-	-	-	-	-
MW-9	68.5 - 69.5	-	-	-	83	26	-	-	-	-	-	-
MW-11	51.0 - 52.0	-	-	-	14	-	-	-	-	-	-	-
MW-13	38.0 - 39.0	-	-	-	52	13	-	-	-	-	-	-
MW-15	64.0 - 65.0	-	-	-	86	-	-	-	-	-	-	-
MW-16	21.0 - 22.0	-	-	-	87	21	-	-	-	-	-	-
MW-16	30.0 - 31.0	-	-	-	82	22	-	-	-	-	-	-

Table D-1 (Continued)
Summary of Existing Geotechnical Data

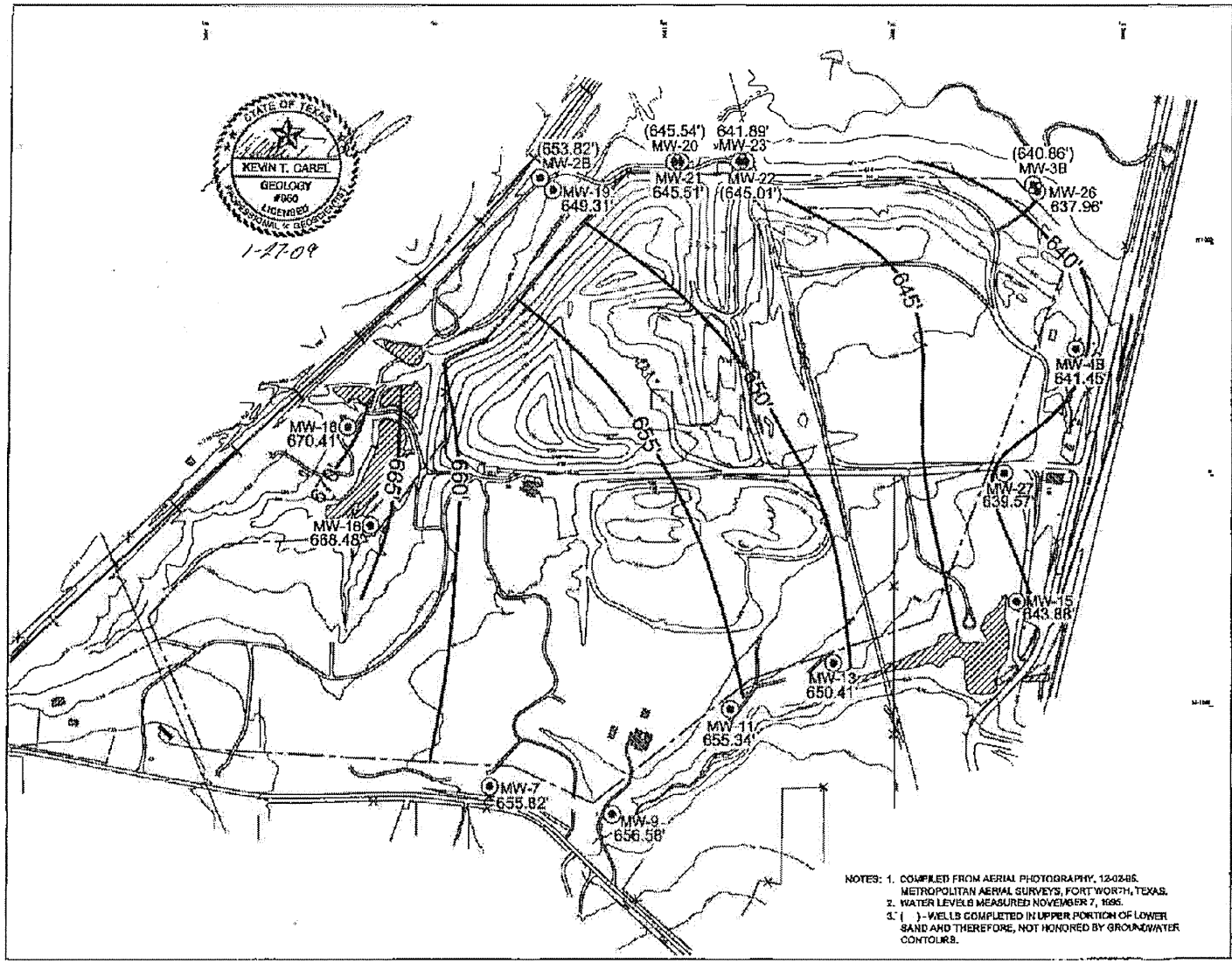
Computation	LL	PL	PI	Passing #200 Sieve (%)	Moisture Content (%)	Dry Weight (pcf)	Horizontal Permeability (cm/s)	Vertical Permeability (cm/s)	Unconfined Compression (tsf)	Pocket Penetrometer Reading (tsf)	Penetration Blows/Ft
Summary of Upper Sand Unit Data											
Mean	42.3	17.3	25.0	56.2	16.5	107.9	-	-	-	3.8	>50
Minimum	20.0	11.0	3.0	4.0	6.0	97.0	-	-	-	2.0	1.0
Maximum	72.0	23.0	49.0	99.0	28.0	121.0	-	-	-	4.5	>50
Standard Deviation	14.7	3.7	12.5	27.4	5.6	8.2	-	-	-	0.9	>50
Number of Tests	43	43	43	72	25	9	0	0	0	31	8
Summary of Bounding Shale Unit Data											
Mean	45.7	17.6	27.8	55.4	18.3	116.1	1.03E-06	2.30E-08	2.4	3.8	>50
Minimum	25.0	12.0	2.0	0.1	13.0	99.0	4.50E-09	1.90E-09	0.8	2.0	1.0
Maximum	67.0	24.0	46.0	100.0	26.0	130.0	5.90E-06	7.80E-08	5.4	4.5	>50
Standard Deviation	10.5	3.2	8.5	40.5	3.4	7.5	2.16E-06	2.69E-08	1.7	0.8	>50
Number of Tests	75	75	75	74	44	31	7	9	8	16	8
Summary of Lower Sand Unit Data											
Mean	32.8	16.4	16.4	67.8	19.8	-	4.67E-05	-	-	-	-
Minimum	25.0	13.0	3.0	14.0	13.0	-	2.00E-05	-	-	-	-
Maximum	45.0	22.0	28.0	92.0	26.0	-	1.00E-04	-	-	-	-
Standard Deviation	7.7	3.4	9.1	28.1	5.0	-	4.62E-05	-	-	-	-
Number of Tests	5	5	5	11	5	0	3	0	0	0	0

APPENDIX E

HISTORICAL GROUNDWATER CONTOUR MAPS



03-10-21



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

1-27-09

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76246

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 350 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

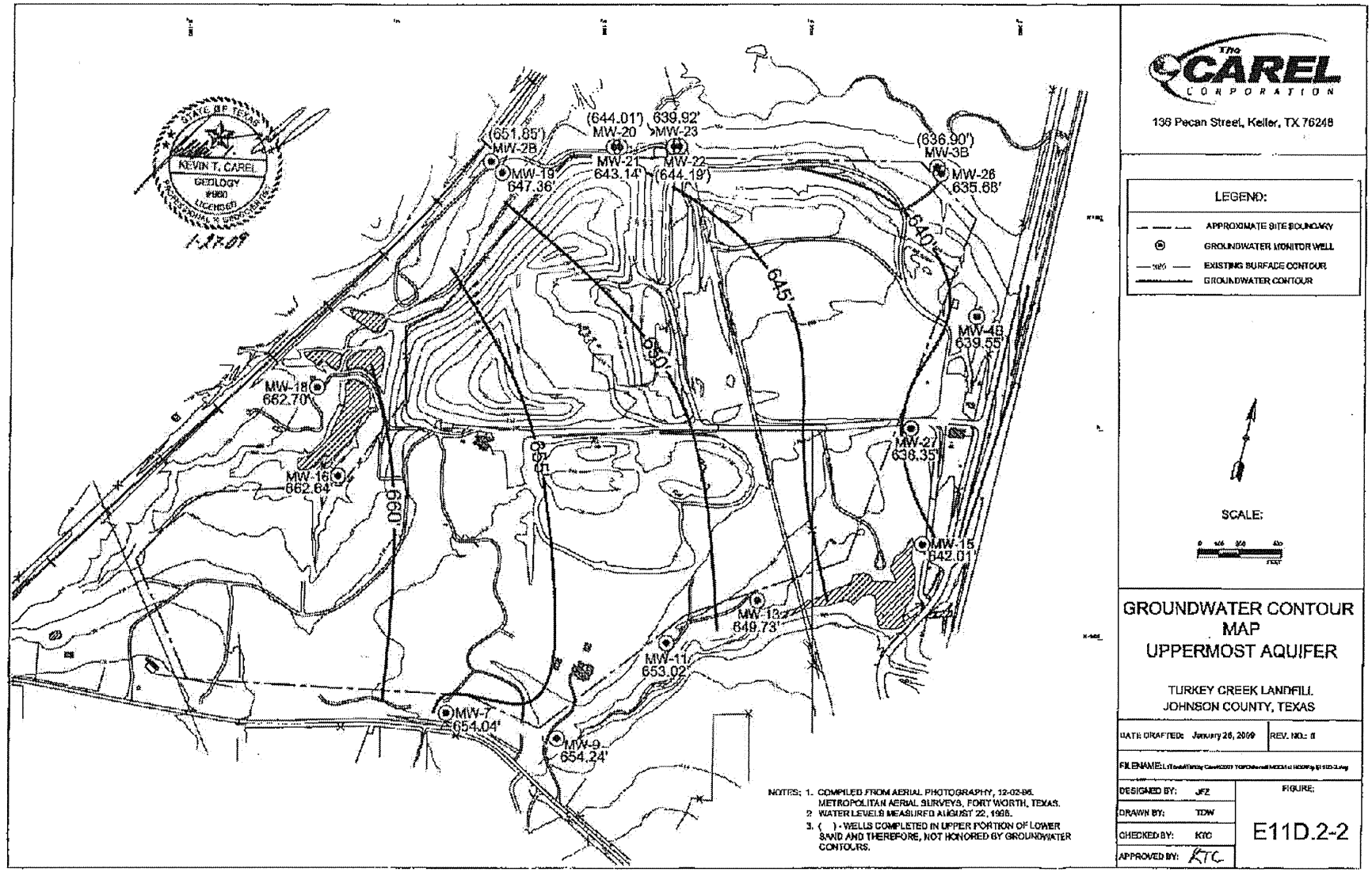
SCALE:

0 200 400
FEET

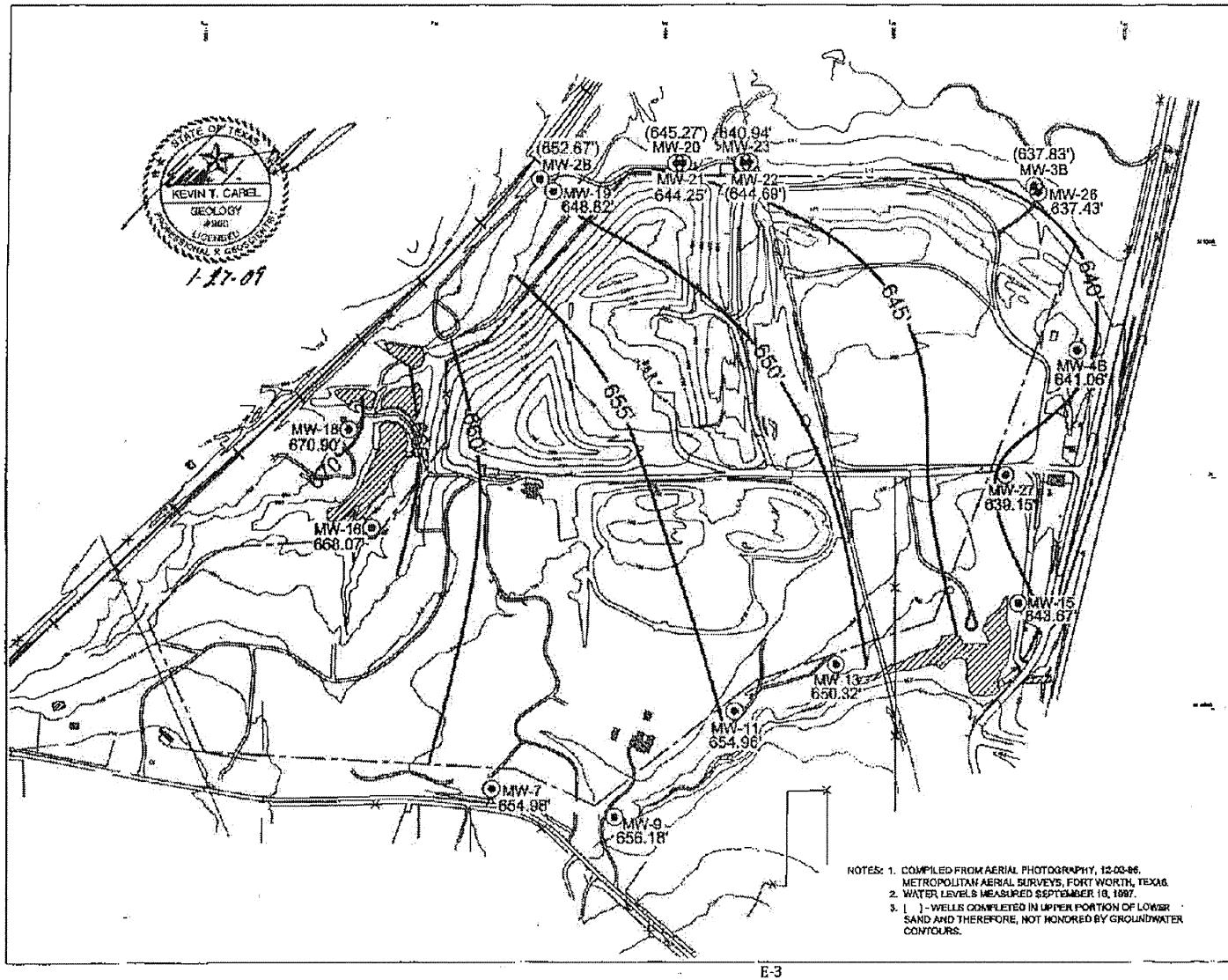
GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-1
CHECKED BY: KTC	
APPROVED BY: KTC	


(651.85')
MW-2B
(644.01')
MW-20
639.92'
MW-23
MW-21
643.14'
MW-22
(644.19')
MW-19
647.36'
(636.90')
MW-3B
MW-26
635.68'
MW-4B
639.55'
MW-18
662.70'
MW-16
662.64'
MW-27
638.35'
MW-15
642.01'
MW-13
649.73'
MW-11
653.02'
MW-7
654.04'
MW-9
654.24'
645'
650'
660'
KEVIN T. CAREL
GEOLOGY
#980
LICENSED
PROFESSIONAL GEOSCIENTIST
STATE OF TEXAS
1-17-09
NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 12-02-96. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 22, 1996.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.
THE CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DATE DRAFTED: January 26, 2009
REV. NO.: 0
DESIGNED BY: JFZ
DRAWN BY: TDW
CHECKED BY: KTC
APPROVED BY: KTC
FIGURE:
E11D.2-2

E-2



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
LICENSED
PROFESSIONAL GEOSCIENTIST
1-27-09

The CAREL CORPORATION
138 Pecan Street, Keller, TX 76248

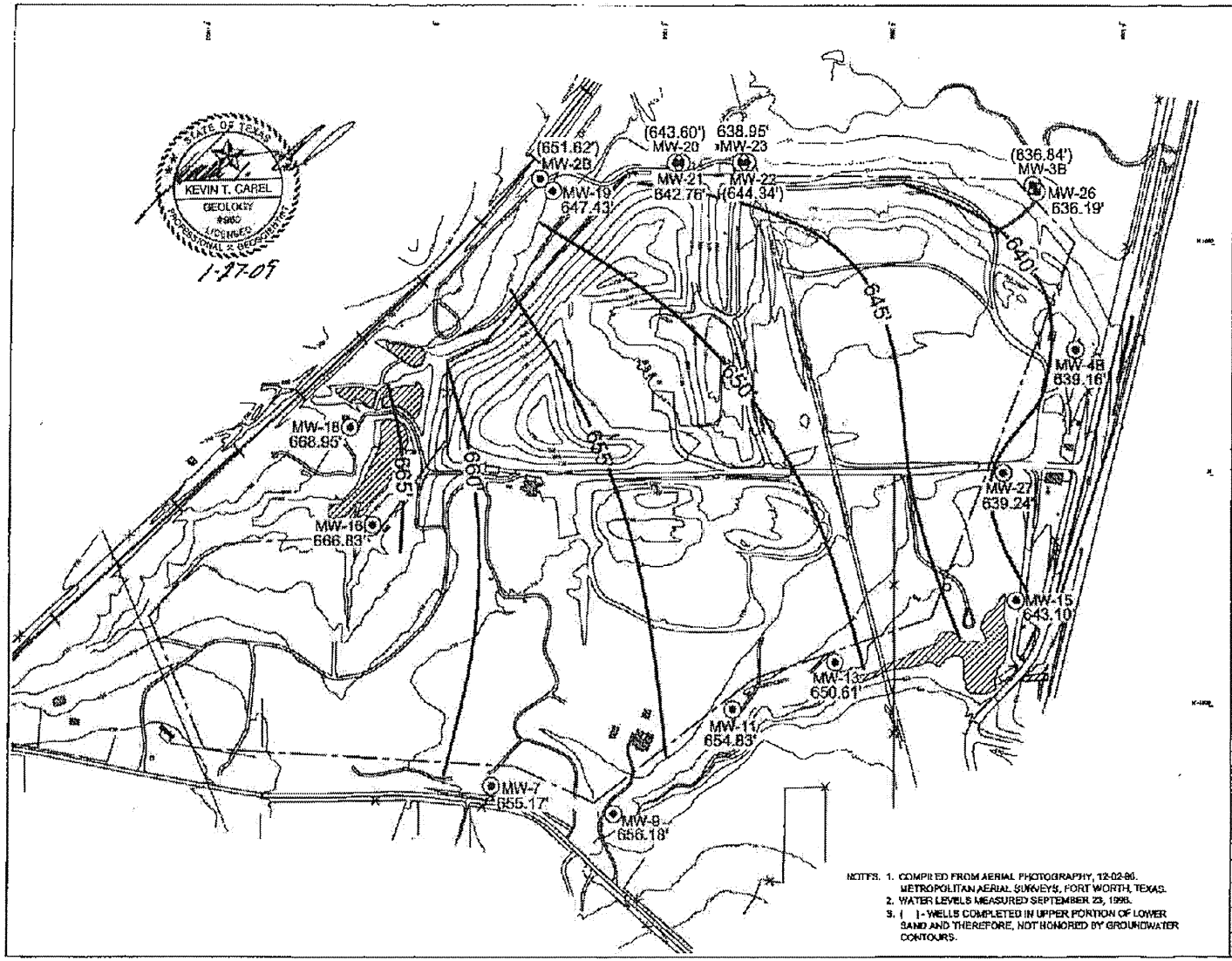
LEGEND:
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 7, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-3
CHECKED BY: KTC	
APPROVED BY: KTC	



The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 650 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

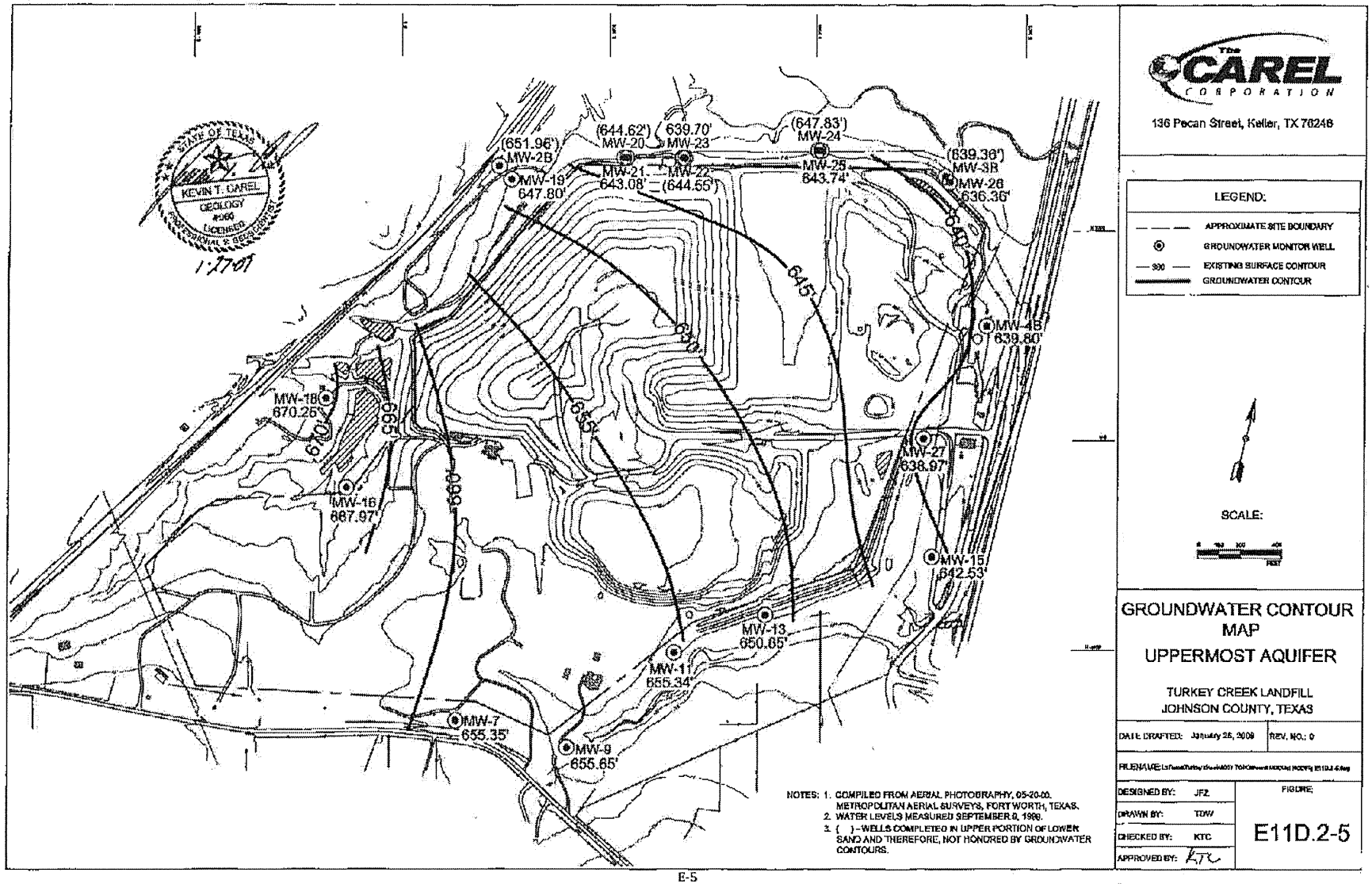
SCALE:

0 100 200 400 FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 28, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-4
CHECKED BY: KTC	
APPROVED BY: KTC	


(651.96')
MW-2B
(644.62')
MW-20
639.70'
MW-23
(647.83')
MW-24
(639.36')
MW-3B
MW-19
647.80'
MW-21
643.08'
MW-22
(644.55')
MW-25
643.74'
MW-26
636.36'
MW-18
670.25'
MW-16
667.97'
MW-27
638.97'
MW-45
639.80'
MW-15
642.53'
MW-13
650.65'
MW-11
655.34'
MW-7
655.35'
MW-9
655.65'
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
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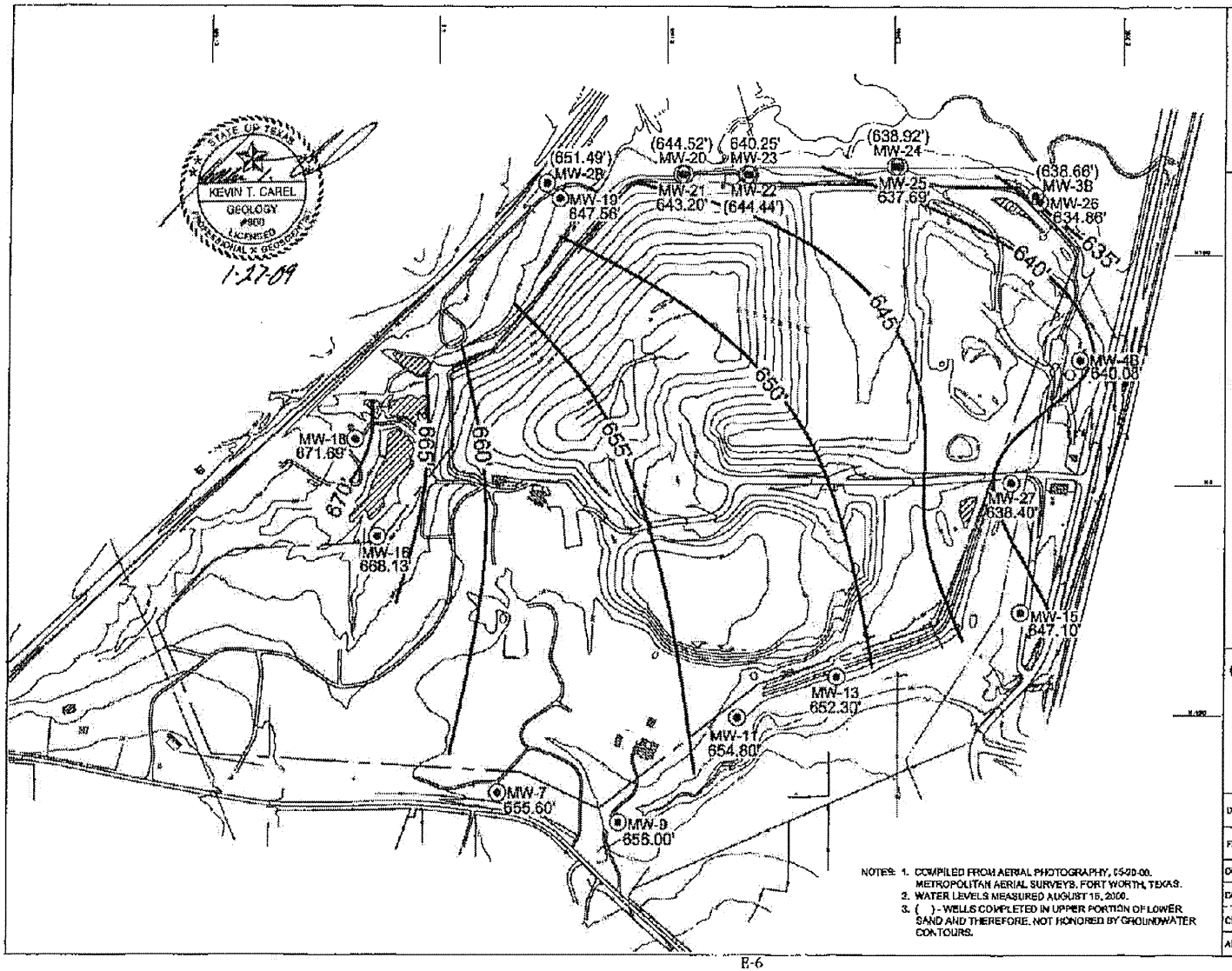
815
820
825
830
835
840



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 03-20-00, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 15, 2008.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

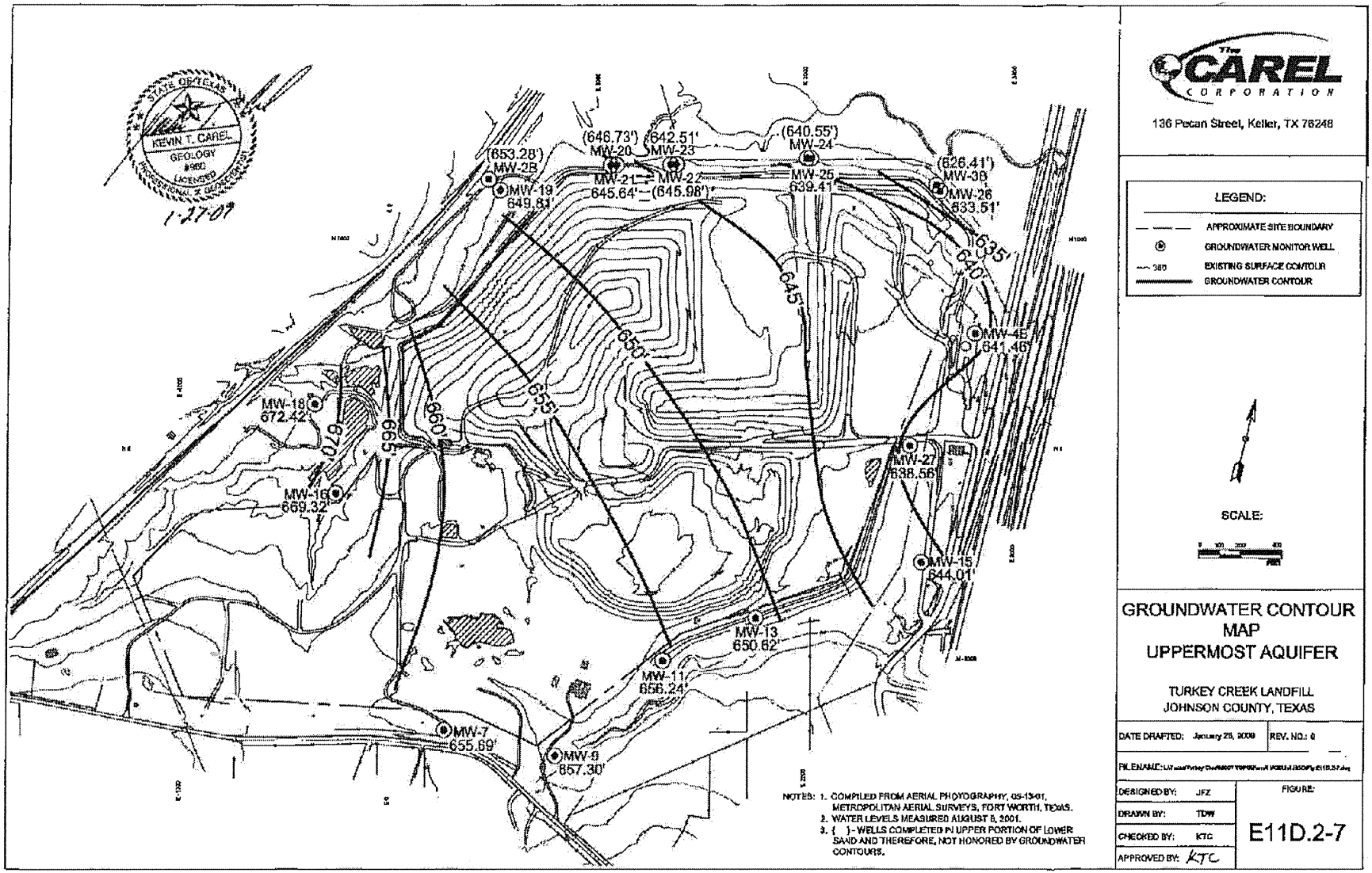
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-6
CHECKED BY: KTC	
APPROVED BY: KTC	



The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

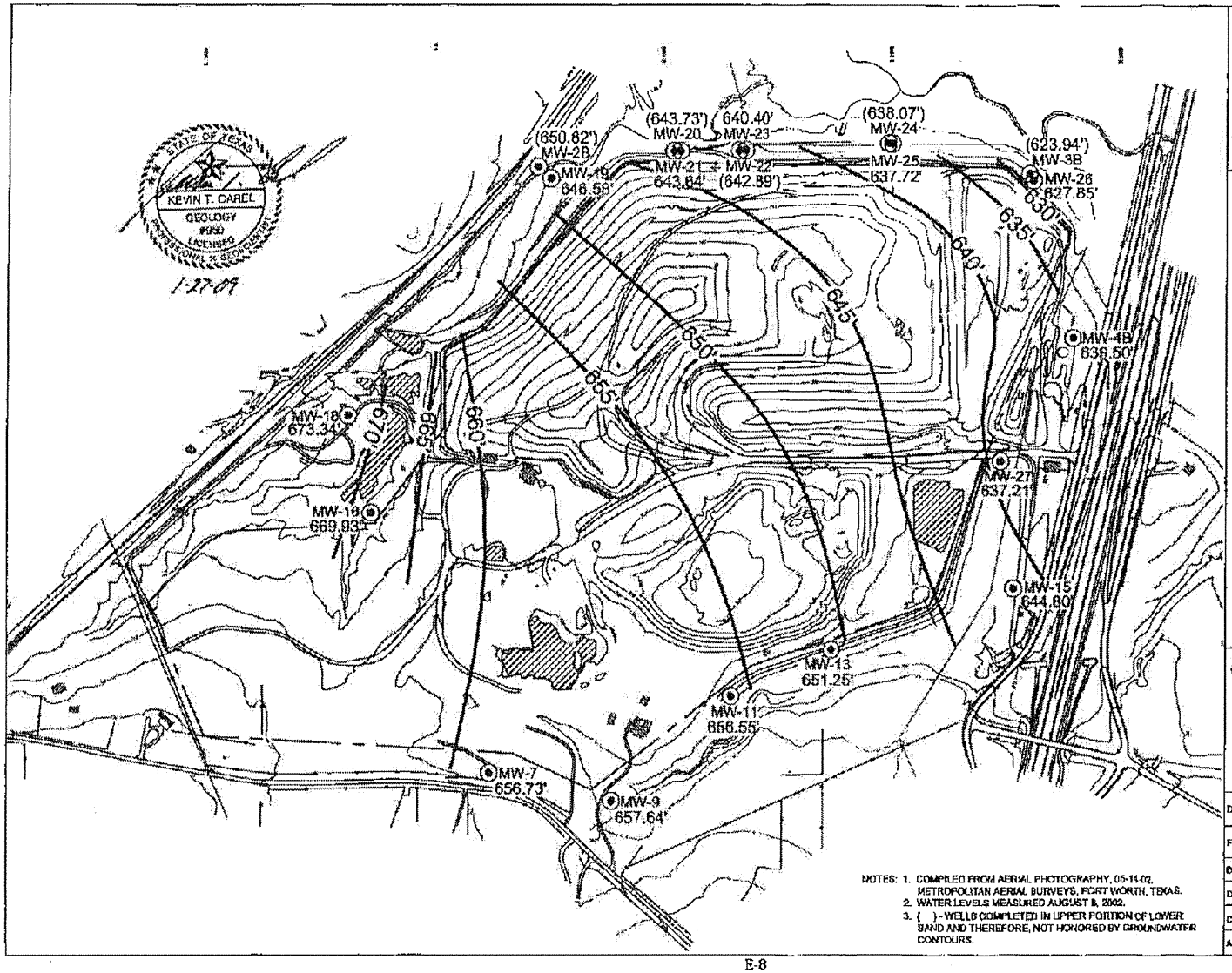
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 980 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 29, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-7
CHECKED BY: KTC	
APPROVED BY: KTC	



The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 350 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

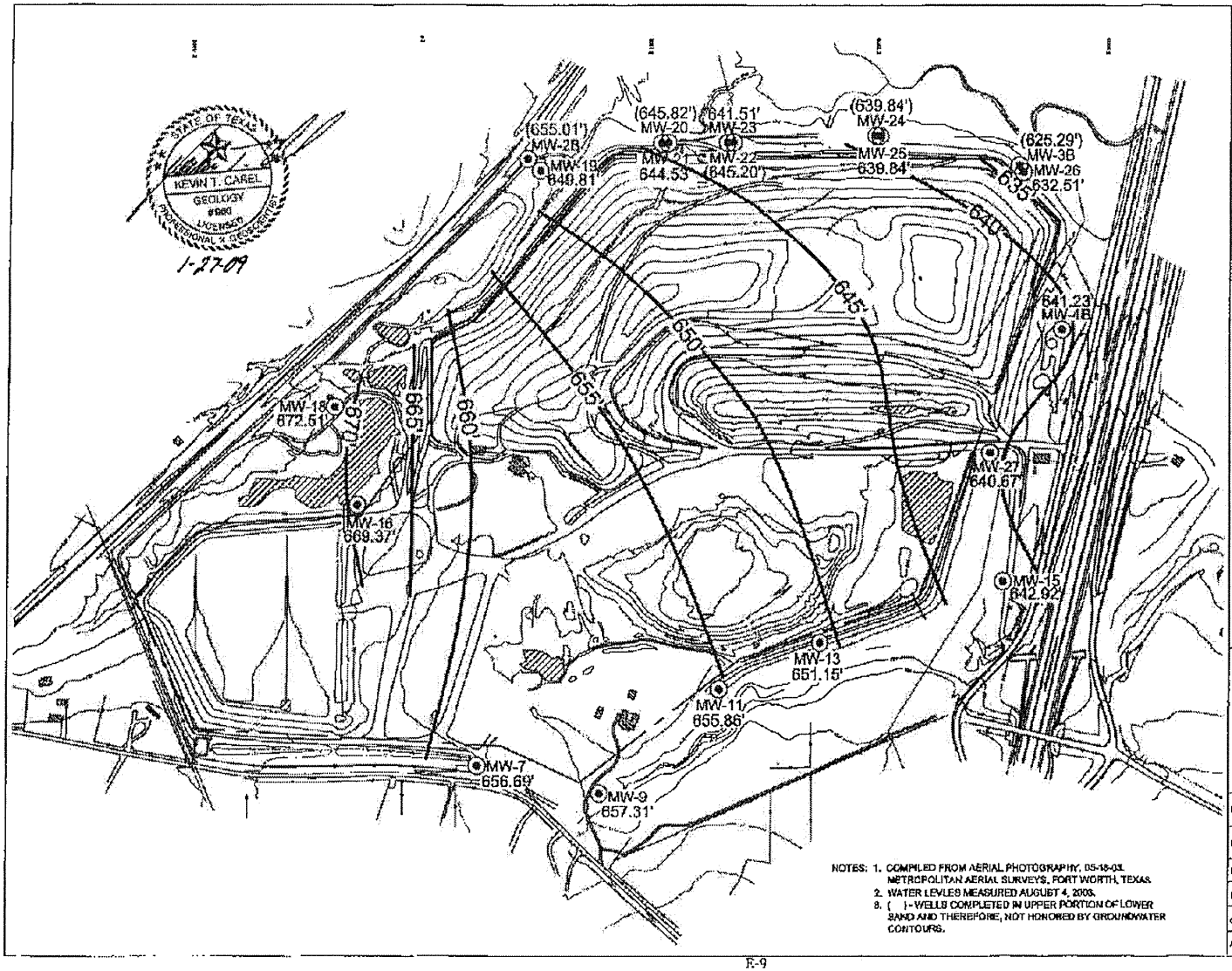
SCALE:

0 120 240 480 FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
FILENAME: [illegible]	
DESIGNED BY: JPZ	FIGURE:
DRAWN BY: TDW	E11D.2-8
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-18-03, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVLES MEASURED AUGUST 4, 2003.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 700 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

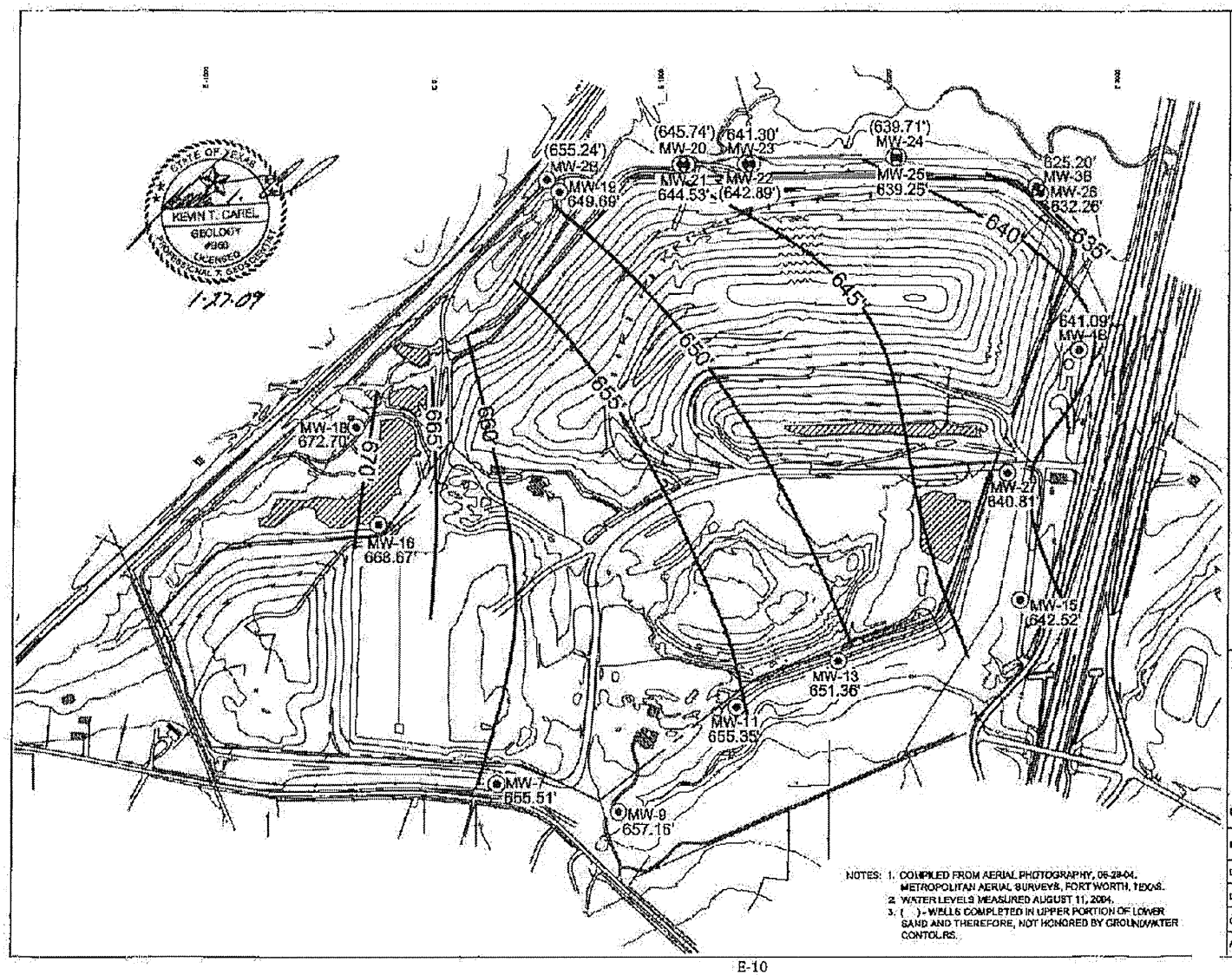
SCALE:

0 100 200 400 FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-9
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-29-04, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 11, 2004.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
138 Pecan Street, Keller, TX 76248

LEGEND:

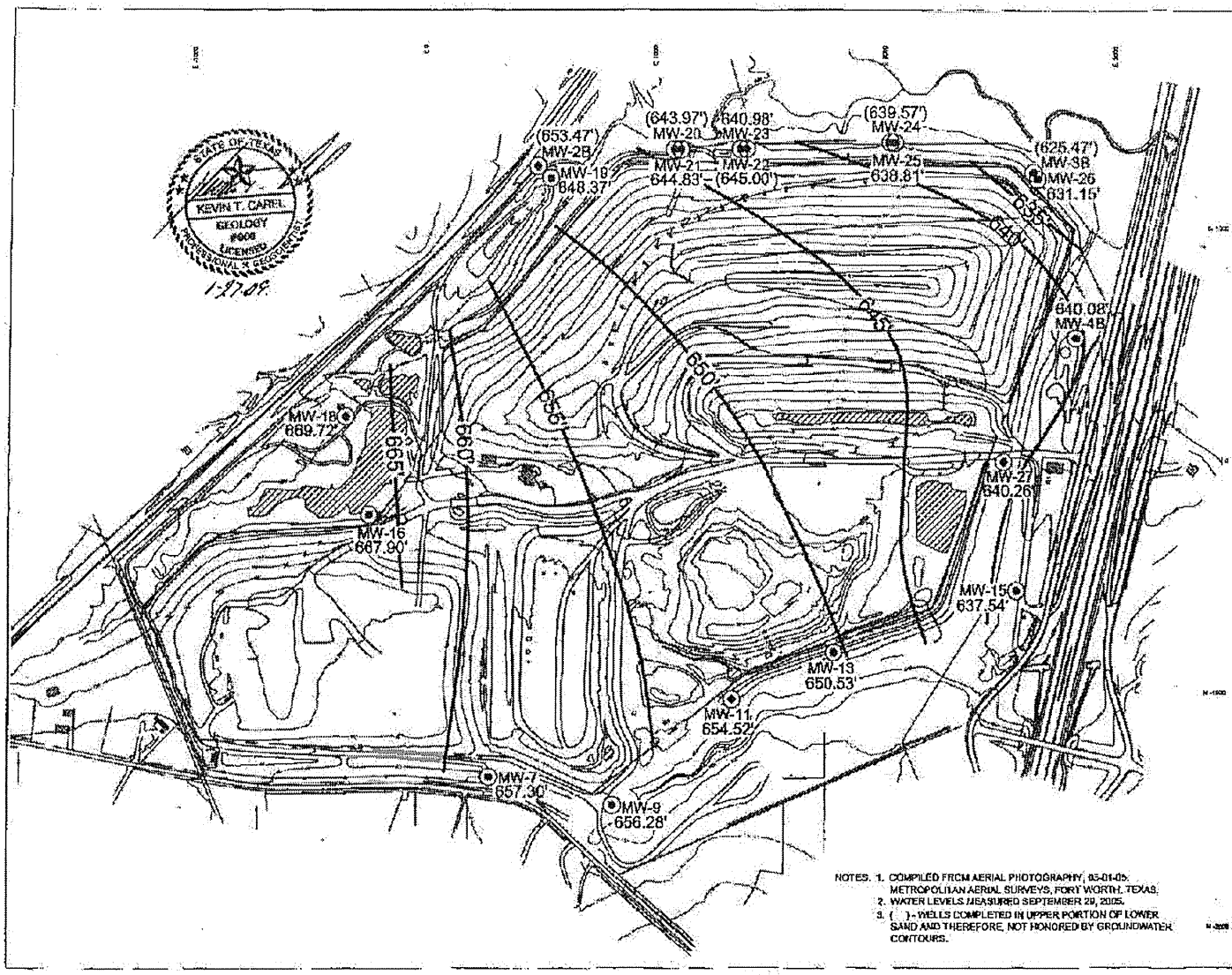
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 960 — EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 28, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-10
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES. 1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-01-05. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 29, 2005.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

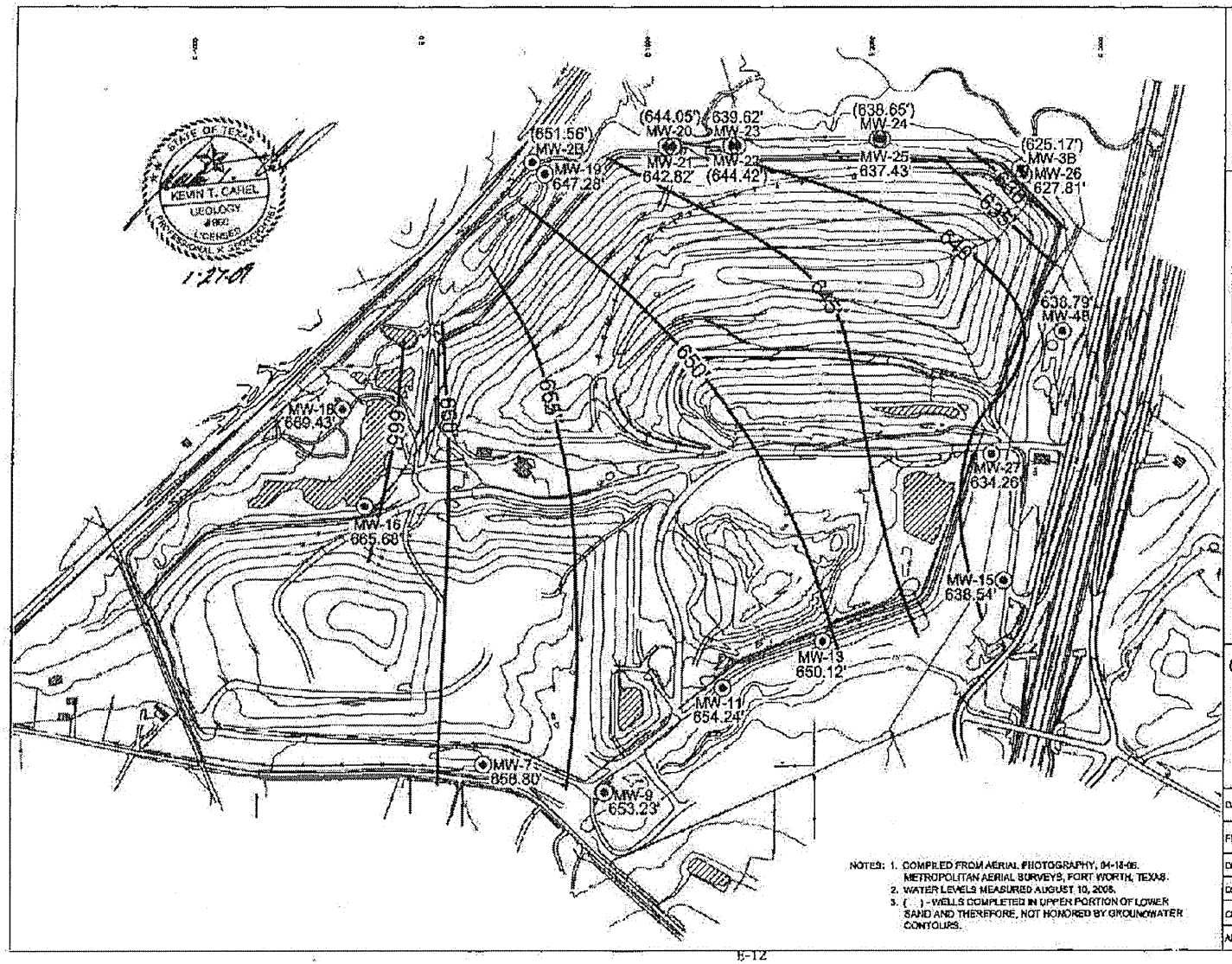
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 28, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-11
CHECKED BY: KTC	
APPROVED BY: KTC	



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

1-27-09

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

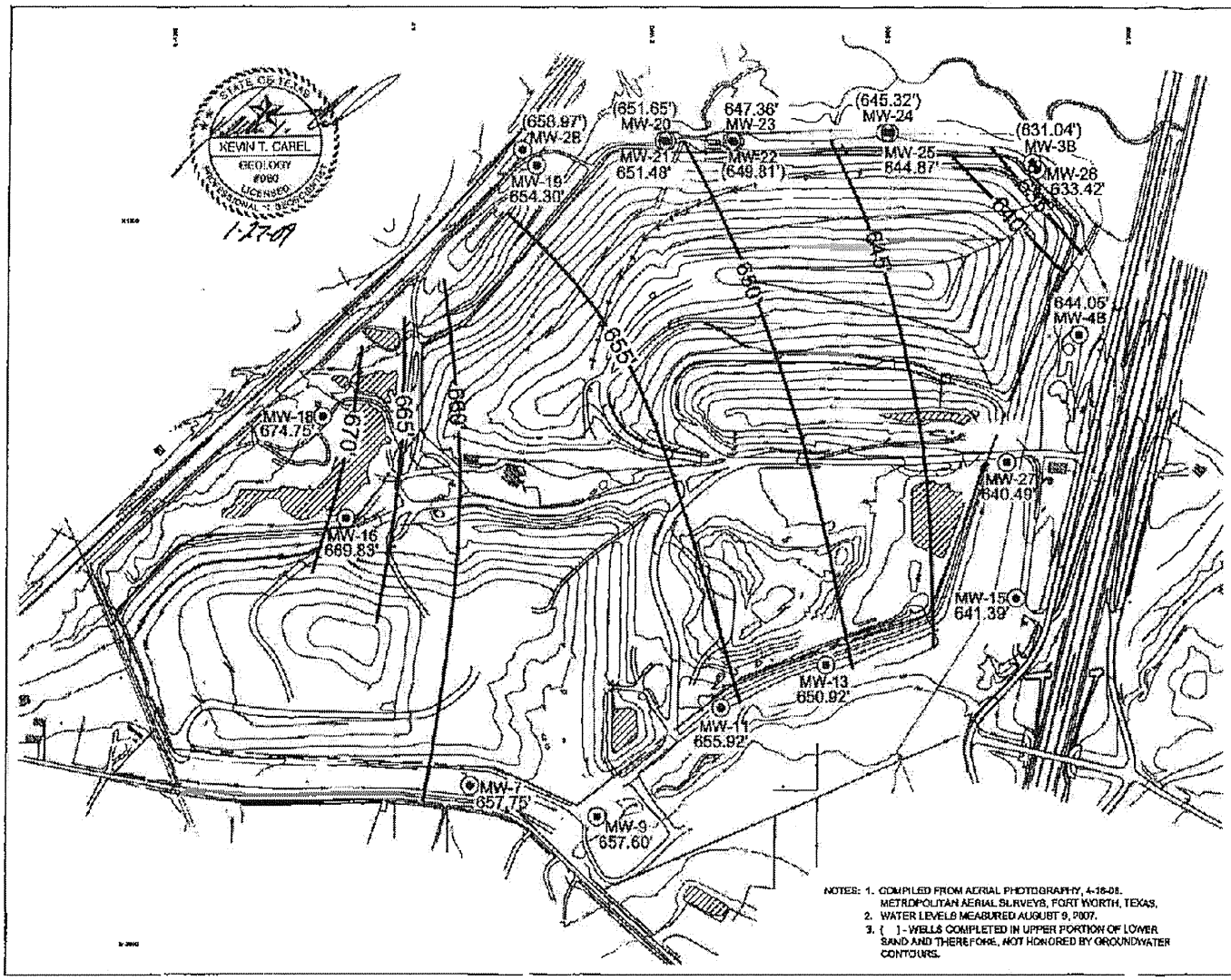
- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-12
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 4-18-08. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 9, 2007.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 350 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

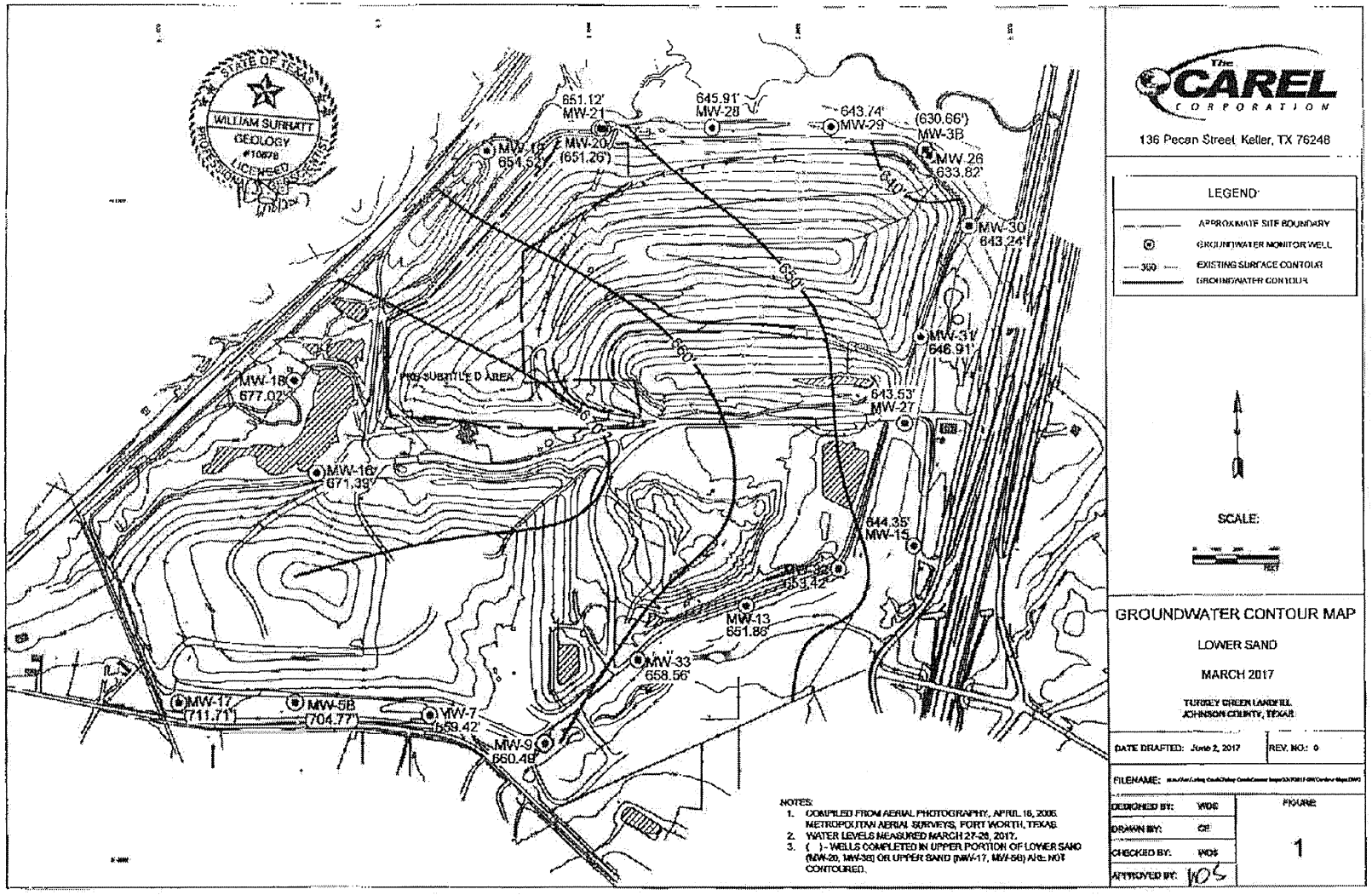
SCALE:

GROUNDWATER CONTOUR MAP

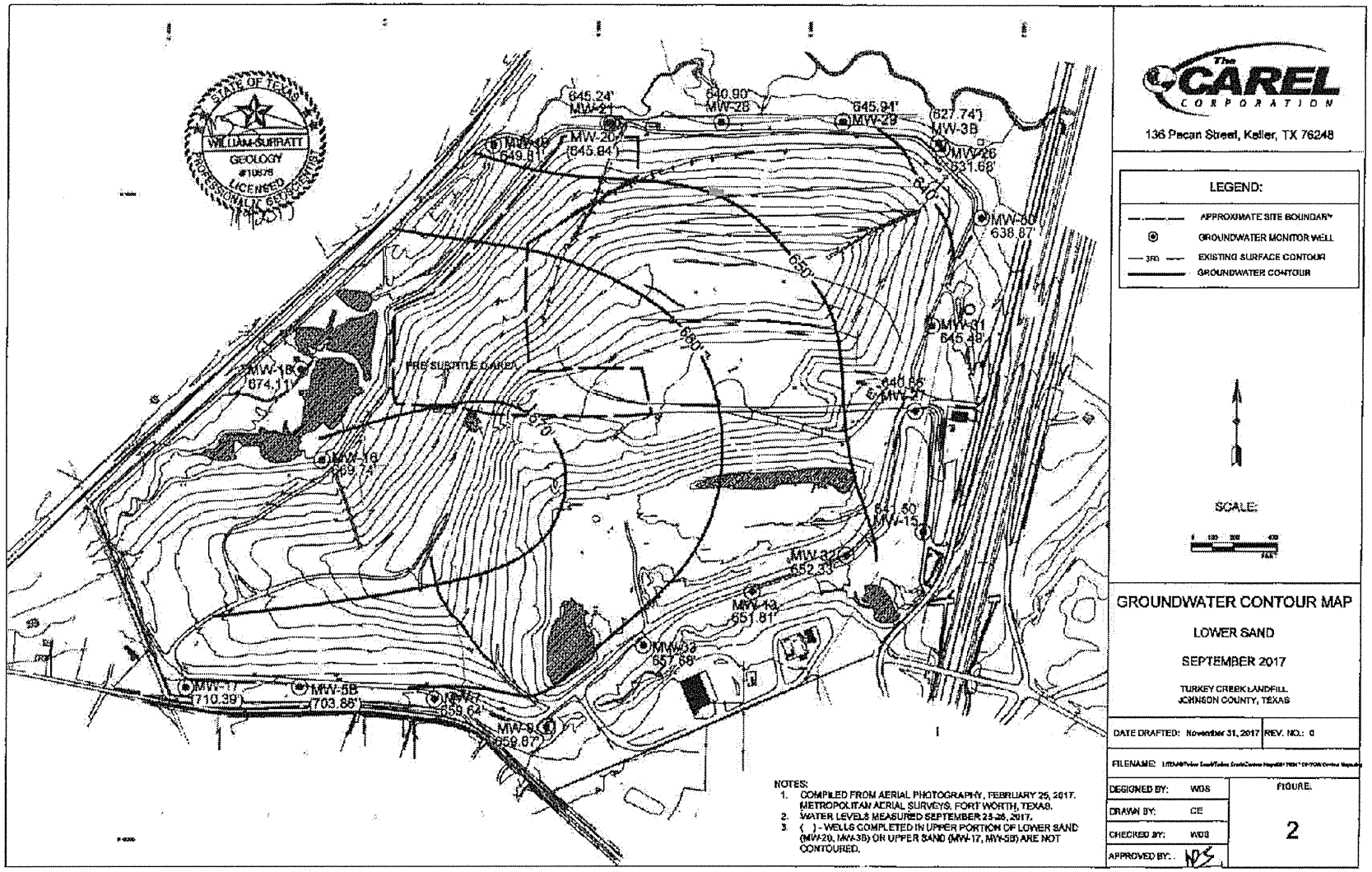
UPPERMOST AQUIFER

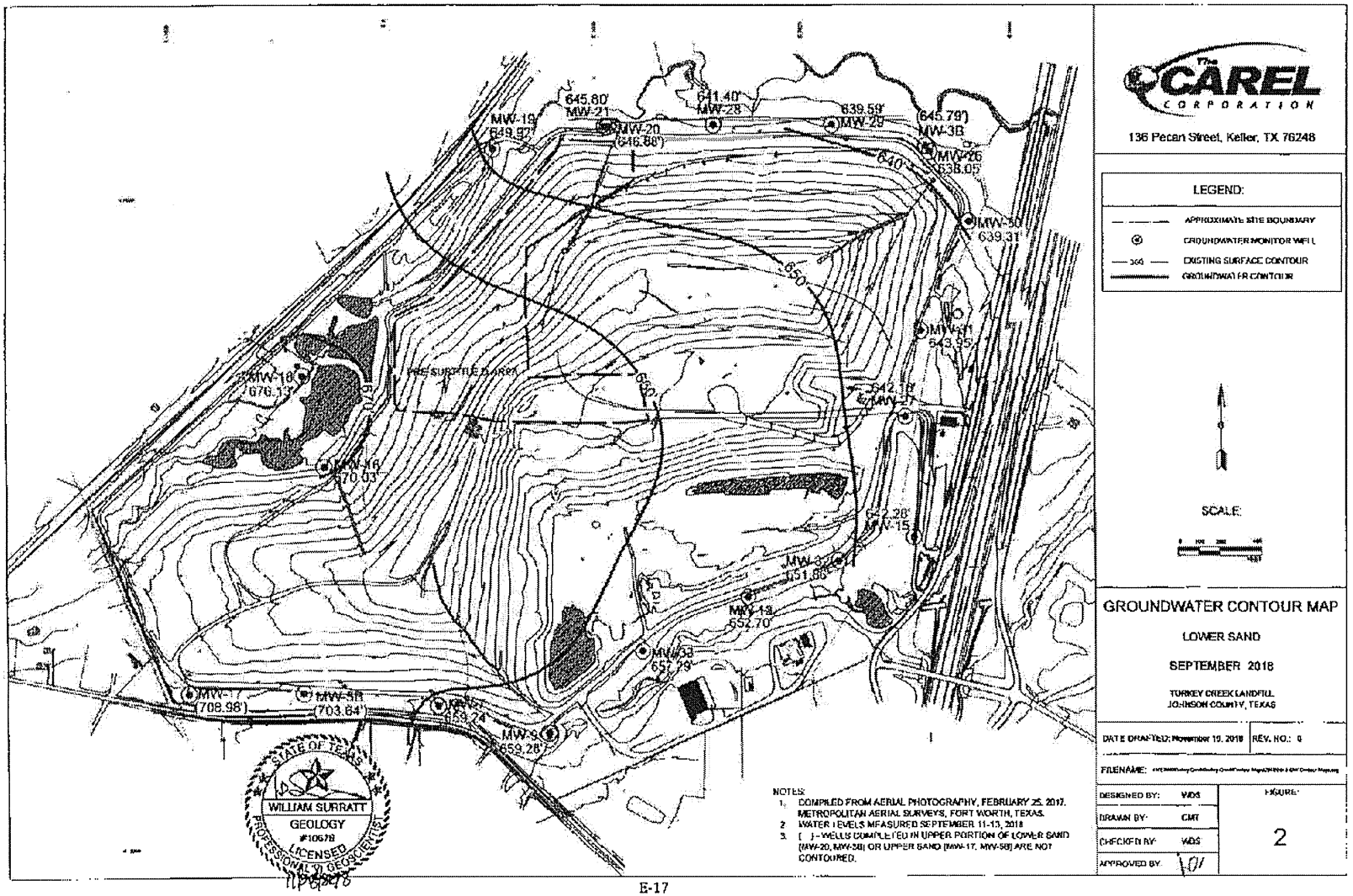
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 28, 2009	REV. NO.: 0
FILENAME:	
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-13
CHECKED BY: KTC	
APPROVED BY: KTC	

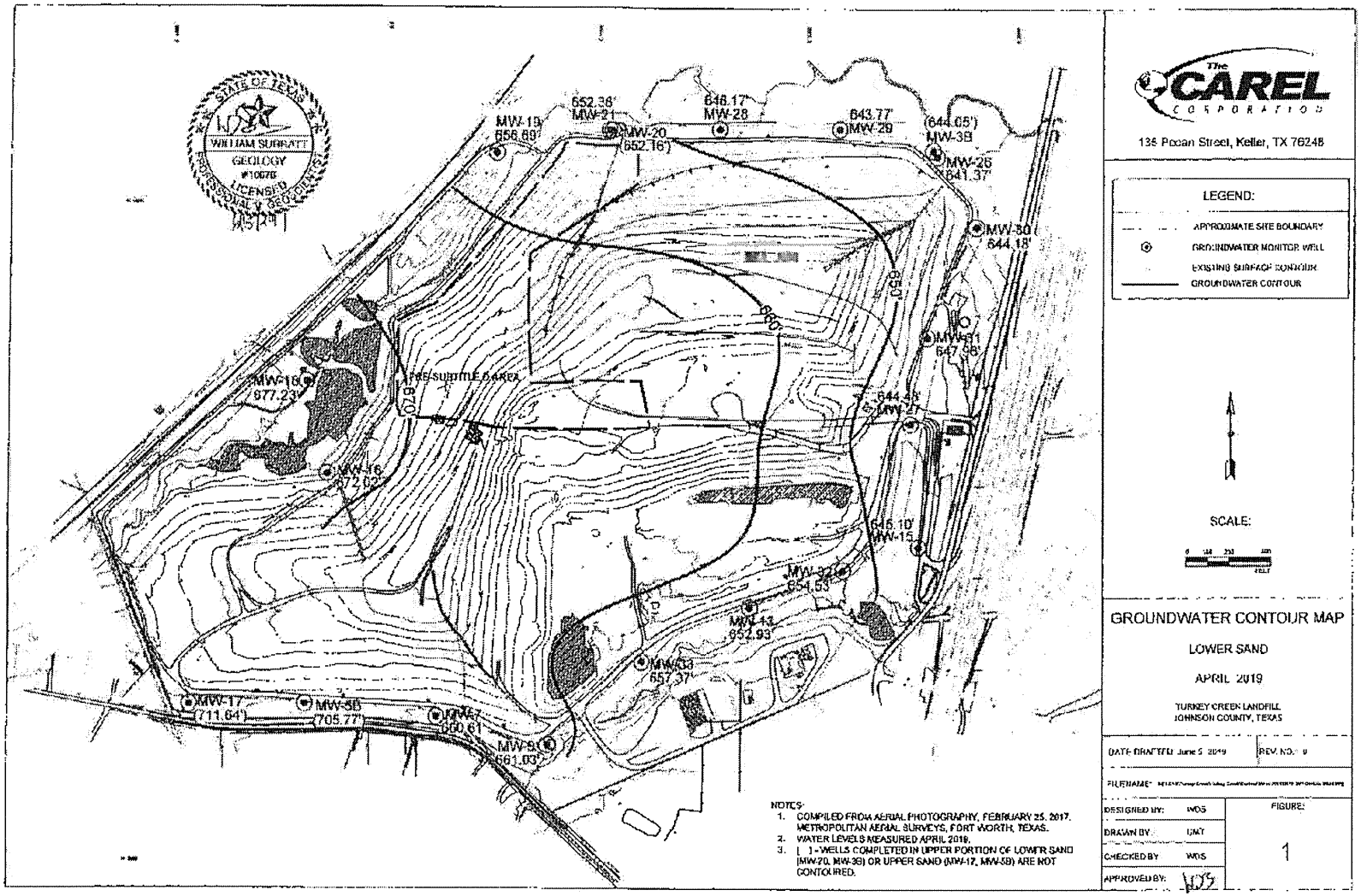


The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
LOWER SAND
MARCH 2017
TURKEY GREEN LANDFILL
JOHNSON COUNTY, TEXAS
DATE DRAFTED: June 2, 2017
REV. NO.: 0
FILENAME:
DESIGNED BY: WDS
DRAWN BY: CE
CHECKED BY: WDS
APPROVED BY: WDS
FIGURE
1
NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, APRIL 16, 2005. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED MARCH 27-28, 2017.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND (MW-20, MW-38) OR UPPER SAND (MW-17, MW-56) ARE NOT CONTOURED.
STATE OF TEXAS
WILLIAM SURRATT
GEOLOGY
#10878
LICENSED
PROFESSIONAL GEOSCIENTIST
651.12'
MW-21
645.91'
MW-28
643.74'
MW-29
(630.66')
MW-3B
MW-26
633.82'
MW-20
(651.26')
MW-30
643.24'
MW-31
646.91'
MW-18
677.02'
PRE-SUBTITLE D AREA
643.53'
MW-27
MW-16
671.39'
644.35'
MW-15
MW-13
651.86'
MW-33
658.56'
MW-17
(711.71')
MW-5B
(704.77')
MW-7
659.42'
MW-9
660.48'

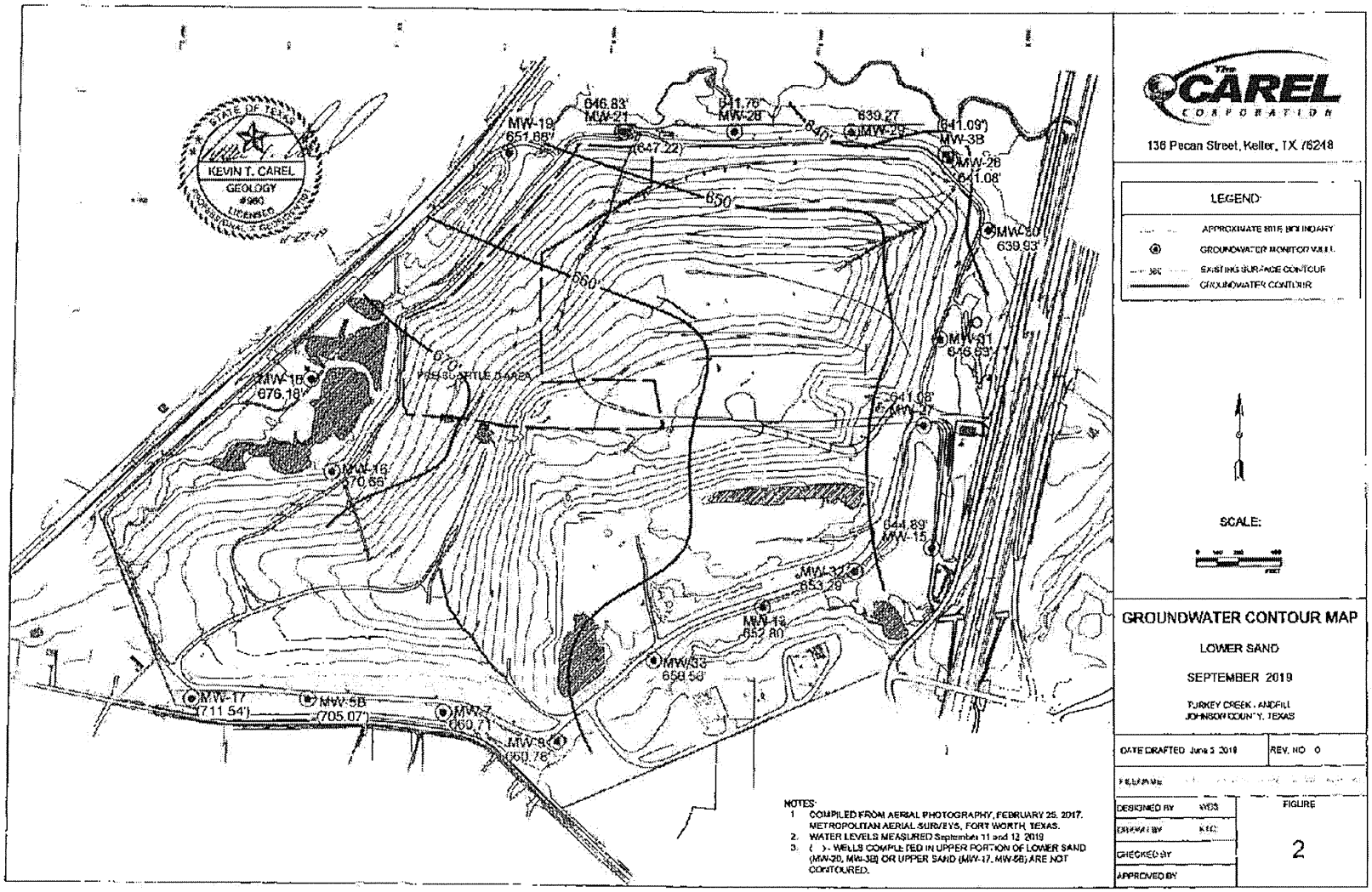

STATE OF TEXAS
WILLIAM SURRATT
GEOLOGY
#10575
LICENSED
PROFESSIONAL GEOLOGIST
645.24'
MW-21
640.90'
MW-28
645.91'
MW-29
(627.74')
MW-3B
MW-20
(645.84')
649.81'
MW-26
631.68'
MW-30
638.87'
650'
MW-31
645.48'
MW-18
674.11'
PRE SUBTITLE D AREA
646.56'
MW-27
MW-16
669.74'
641.50'
MW-15
MW-32
652.33'
MW-13
651.81'
MW-33
657.68'
MW-17
710.39'
MW-5B
703.86'
MW-4
659.64'
MW-9
659.87'
NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, FEBRUARY 25, 2017. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 25-26, 2017.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND (MW-20, MW-3B) OR UPPER SAND (MW-17, MW-5B) ARE NOT CONTOURED.
The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
LOWER SAND
SEPTEMBER 2017
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DATE DRAFTED: November 31, 2017
REV. NO.: 0
DESIGNED BY: WDS
DRAWN BY: CE
CHECKED BY: WDS
APPROVED BY: WDS
FIGURE
2



The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
LOWER SAND
SEPTEMBER 2018
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DATE DRAFTED: November 19, 2018
REV. NO.: 0
FILENAME:
DESIGNED BY: WDS
DRAWN BY: CMT
CHECKED BY: WDS
APPROVED BY: WDS
FIGURE:
2
NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, FEBRUARY 25, 2017, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 11-13, 2018
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND (MW-20, MW-3B) OR UPPER SAND (MW-17, MW-5B) ARE NOT CONTOURED.
MW-19 649.92'
645.80' MW-21
MW-20 (646.88')
641.40' MW-28
639.59' MW-29
(645.79') MW-3B
MW-26 638.05'
MW-30 639.31'
MW-11 643.95'
642.18' MW-27
MW-18 676.13'
MW-16 670.03'
642.28' MW-15
MW-32 651.86'
MW-13 652.70'
MW-33 657.29'
MW-17 (708.98')
MW-5B (703.64')
MW-7 659.24'
MW-9 659.28'
640
650
660
670
PRE-SURFACE AREA
STATE OF TEXAS
WILLIAM SURRATT
GEOLOGY
#10678
LICENSED
PROFESSIONAL GEOSCIENTIST


WILLIAM SURRATT
GEOLOGY
#10676
LICENSED
PROFESSIONAL GEOLOGIST
MW-19
656.69'
652.36'
MW-21
MW-20
(652.16')
646.17'
MW-28
643.77'
MW-29
(644.65')
MW-39
MW-26
641.37'
MW-30
644.18'
MW-31
647.98'
644.45'
MW-27
646.10'
MW-15
MW-16
677.23'
MW-18
672.62'
FEE-SUBTITLE D AREA
MW-32
654.53'
MW-13
652.93'
MW-33
657.37'
MW-17
(711.64')
MW-55
(705.77')
MW-7
660.61'
MW-5
661.03'
NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, FEBRUARY 25, 2017, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED APRIL 2019.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND (MW-20, MW-39) OR UPPER SAND (MW-17, MW-55) ARE NOT CONTOURED.
The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
LOWER SAND
APRIL 2019
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DESIGNED BY: WDS
DRAWN BY: DMT
CHECKED BY: WDS
APPROVED BY: WDS
FIGURE:
1

E-18



KEVIN T. CAREL
GEOLOGY
#960
LICENSED
STATE OF TEXAS
PROFESSIONAL GEOSCIENTIST
MW-19
651.88'
646.83'
MW-21
(647.22)
641.76'
MW-28
639.27
MW-29
(641.09')
MW-3B
MW-28
641.08'
MW-30
639.93'
MW-31
646.53'
641.08'
MW-27
644.89'
MW-15
MW-32
653.29'
MW-19
652.80
MW-33
658.58'
MW-18
676.18'
MW-16
670.66'
MW-17
(711.54')
MW-5B
(705.07')
MW-7
660.71'
MW-8
660.78'
640'
650'
660'
670'
PRESUBSTITUTE AREA
NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, FEBRUARY 25, 2017, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED September 11 and 12, 2019
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND (MW-20, MW-3B) OR UPPER SAND (MW-17, MW-5B) ARE NOT CONTOURED.
The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248
LEGEND:
APPROXIMATE SITE BOUNDARY
GROUNDWATER MONITOR WELL
EXISTING SURFACE CONTOUR
GROUNDWATER CONTOUR
SCALE:
GROUNDWATER CONTOUR MAP
LOWER SAND
SEPTEMBER 2019
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
DATE DRAFTED June 5 2019
REV. NO. 0
FILE NAME
DESIGNED BY WDS
DRAWN BY KTC
CHECKED BY
APPROVED BY
FIGURE
2

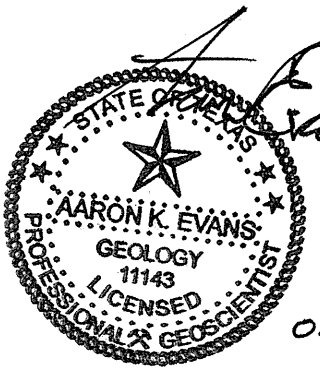
TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS
TCEQ PERMIT NO. MSW-1417D

PART III – SITE DEVELOPMENT PLAN
APPENDIX IIIH
GROUNDWATER SAMPLING AND ANALYSIS PLAN

Prepared for

Texas Regional Landfill Company, LP

February 2022



02/22/22

Prepared by

Weaver Consultants Group, LLC
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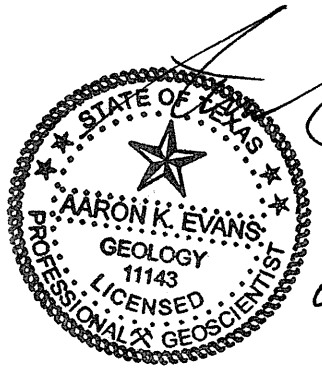
Fort Worth, Texas 76109
817-735-9770

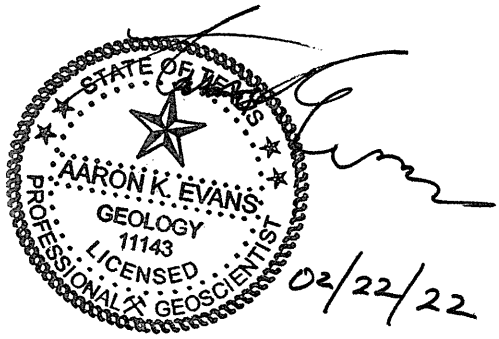
WCG Project No. 0771-368-11-123



02/22/22

CONTENTS

1	**INTRODUCTION**	**IIIH-1**
2	**GROUNDWATER MONITORING SYSTEM**	**IIIH-2**
2.1	Groundwater Monitoring System	IIIH-2
2.1.1	Uppermost Aquifer	IIIH-2
2.1.2	Groundwater Monitoring Network	IIIH-3
2.2	Monitoring Well Design and Maintenance	IIIH-6
2.3	Groundwater Monitoring Program	IIIH-7
3	**GROUNDWATER SAMPLING PROCEDURES**	**IIIH-8**
3.1	Health and Safety Plan	IIIH-8
3.2	Sample Event Preparation and QA/QC	IIIH-8
3.2.1	General Event Preparation	IIIH-8
3.2.2	Sample Container Selection	IIIH-8
3.2.3	Equipment Preparation Prior to Site Arrival	IIIH-8
3.2.4	Field QA/QC Samples	IIIH-9
3.3	Monitoring Well Inspection	IIIH-10
3.4	Monitoring Well Purging	IIIH-10
3.4.1	General Well Purge Information	IIIH-10
3.4.2	Water Level Measurement	IIIH-10
3.4.3	Purge Equipment and Procedures	IIIH-11
3.4.4	Purge Order	IIIH-12
3.4.5	Purge Volume Measurement	IIIH-12
3.4.6	Purge Water Management	IIIH-12
3.5	Monitoring Well Sample Collection	IIIH-13
3.5.1	General Sample Collection Information	IIIH-13
3.5.2	Sample Collection Order	IIIH-13
3.5.3	Sampling Equipment and Procedures	IIIH-13
3.5.4	Sample Preservation	IIIH-13
3.5.5	Field Measurements	IIIH-14
3.6	Record Keeping	IIIH-14
3.6.1	Field Data Sheets	IIIH-14
3.6.2	Chain-of-Custody/Sample Container Labels	IIIH-14
3.7	Sample Transport	IIIH-15
4	**LABORATORY PROCEDURES/PERFORMANCE STANDARDS**	**IIIH-16**
5	**CONSTITUENTS, PQLS, AND DETECTION MONITORING**	**IIIH-19**



CONTENTS (Continued)

	5.1	Analyzed Constituents	IIIH-19
	5.2	Practical Quantitation Limit	IIIH-21
	5.3	Background Data Collection	IIIH-22
	5.4	Updating Background Data	IIIH-23
	5.5	Detection Monitoring Events	IIIH-23
	5.6	Groundwater Reporting and Submittals	IIIH-23
		5.6.1 Semiannual Detection Monitoring Reporting	IIIH-24
		5.6.2 Semiannual Assessment Monitoring Reporting	IIIH-25
6	**STATISTICAL METHODOLOGY – GROUNDWATER DATA ANALYSES**		**IIIH-26**
	6.1	Statistical Methodology	IIIH-26
	6.2	Exceedances, Resampling, ASDs, and Assessment Monitoring	IIIH-26
		6.2.1 Verification Resampling	IIIH-26
	6.3	Assessment Monitoring	IIIH-27
	6.4	Corrective Action Monitoring	IIIH-28
7	**GROUNDWATER ANALYTICAL RESULTS AND POTENTIAL RESPONSE ACTIONS**		**IIIH-29**
	7.1	Groundwater Quality	IIIH-29
	7.2	Potential Contaminant Migration	IIIH-29
8	**REFERENCES**		**IIIH-30**

APPENDIX IIIH-A
Groundwater Monitoring System

APPENDIX IIIH-B
Groundwater Monitoring Data

APPENDIX IIIH-C
Sample Field Data Sheet

APPENDIX IIIH-D
Containerization and Preservation of Samples

APPENDIX IIIH-E

CONTENTS (Continued)

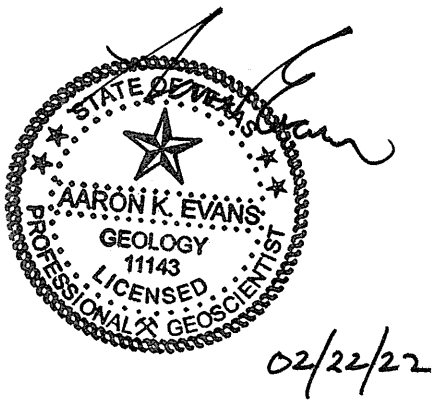
Sample Chain-of-Custody Form

APPENDIX IIIH-F
Statistical Analyses Flow Charts

APPENDIX IIIH-G
Sample Laboratory QC Checklist

TABLES

Table		Page No.
2-1	Groundwater Monitoring Well Network	IIIH-6
5-1	Detection Monitoring Constituents	IIIH-20



02/22/22

1 INTRODUCTION



This groundwater sampling and analysis plan (GWSAP) has been prepared for the Turkey Creek Landfill (Municipal Solid Waste [MSW] Permit No. 1417D). This plan incorporates the GWSAP procedures and methodology from the previous permit (MSW Permit No. 1417C). The following plan contains the groundwater monitoring system design aspects, system engineering report, the procedures for collecting representative samples from groundwater monitoring wells, and the basic laboratory requirements for obtaining representative data. The plan also includes monitoring well placement, design and construction, and well development procedures. This GWSAP has been prepared, and will be followed, in accordance with Title 30 TAC §330.401 through §330.415, §330.419 and §330.421. Groundwater monitoring will be conducted through the active life of the site and post-closure care period, pursuant to Title 30 TAC §330.401(f).

2 GROUNDWATER MONITORING SYSTEM

2.1 Groundwater Monitoring System

The facility's existing and proposed groundwater monitoring systems are shown on Figure IIIH-A-1 (Groundwater Monitoring System Layout) in Appendix IIIH-A. The existing groundwater monitoring system was approved in 2020 with the issuance of Permit No. MSW-1417C. The existing groundwater monitoring network consists of 16 point of compliance (POC) monitoring wells and two background monitoring wells. These 18 existing groundwater detection monitoring wells were surveyed for vertical and horizontal control by Weaver Consultants Group, LLC (WCG) in January 2020. The 2020 as-built survey data (signed and sealed by a Texas-licensed Registered Professional Land Surveyor [RPLS]) are provided on page IIIH-A-6 in Appendix IIIH-A.

Pursuant to the proposed lateral landfill expansion for Permit No. MSW-1417D, the facility advanced 12 geotechnical borings and installed groundwater piezometers in eight of the borings in 2021 to assess hydrogeological and geotechnical conditions for the proposed lateral expansion areas. The facility's existing and previously advanced borehole, piezometer, and monitoring well locations are shown on Figure IIIG-B-1 in Appendix IIIG (Geology Report) of the Site Development Plan (SDP). The 2021-installed piezometers were surveyed for vertical and horizontal control by WCG in September 2021 and their as-built survey data (signed and sealed by a Texas RPLS) are provided on page IIIH-A-7 in Appendix IIIH-A. Regional and site-specific hydrogeology are detailed in Appendix IIIG of the SDP.

2.1.1 Uppermost Aquifer

The permitted uppermost aquifer beneath the facility is contained within the Lower Sand unit and upper saturated portions of the Bounding Shale unit sediments which are in hydraulic connection with Upper Sand unit sediments at the northern permit boundary. The facility's existing groundwater monitoring system (approved under Permit No. MSW-1417C) is designed to monitor the permitted uppermost aquifer. The facility's existing and proposed groundwater point of compliance (POC) monitoring wells are screened within the uppermost aquifer. The lower portion of the site-specific Bounding Shale unit comprises the lower confining unit for perched groundwater present within the uppermost aquifer.

Groundwater elevations measured in the wells and piezometers historically indicate groundwater flow largely mimics natural surface topography and flows towards the permitted point of compliance to the north and northeast.

In 2008/2009 the Carel Corporation reviewed the facility's historical subsurface data and delineated the uppermost aquifer to its current permitted characterization. Pursuant to the 2008/2009 evaluation, the Carel Corporation produced 13 uppermost aquifer potentiometric surface contour maps using groundwater gauging data collected during routine sampling events completed from 1995 through 2007. These groundwater maps are included in Appendix IIIH-A and demonstrate a consistent groundwater flow regime toward the north and northeast permit boundary over a span of 12 consecutive years. The existing permitted groundwater monitoring system design is based on this accurately depicted groundwater flow regime established by the Carel Corporation.

Pursuant to the proposed lateral landfill expansion for Permit No. MSW-1417D, the facility installed eight groundwater piezometers in 2021 and static groundwater elevation gauging of these piezometers began in September 2021. Groundwater potentiometric surface contour maps prepared from sitewide groundwater gauging data collected by WCG in September and November 2021 are included on Figures IIIG-D-1 and IIIG-D-2 in Appendix IIIG of the SDP. The 2021 groundwater elevation data were collected from the facility's 18 existing groundwater detection monitoring wells and the eight subsurface investigation piezometers installed in 2021. These recent sitewide potentiometric surface contours indicate an uppermost aquifer groundwater flow regime consistent with those depicted historically.

2.1.2 Groundwater Monitoring Network

The facility's existing and proposed groundwater monitoring networks are shown on Figure IIIH-A-1 (Groundwater Monitoring System Layout) in Appendix IIIH-A and include the interwell spacing distances between the proposed point of compliance groundwater monitoring wells.

The initial iteration of the currently approved groundwater monitoring system network was designed in 2008/2009 by the Carel Corporation to comply with Title 30 TAC §330.403(a)(2) as part of the TCEQ-approved 600-foot groundwater monitoring well spacing permit modification. The 2009 groundwater monitoring network (approved under Permit No. MSW-1417B) included 16 point of compliance (POC) and four background monitoring wells.

In 2019/2020, pursuant to a major permit amendment for a vertical landfill expansion (Permit No. MSW-1417C), the groundwater monitoring system network design was revisited, and minor revisions were made via the removal of two ancillary background monitoring wells (MW-5B and MW-16) which were plugged and abandoned in September 2021 following the final issuance of Permit No. MSW-1417C. The existing groundwater monitoring network includes 16 point of compliance (POC) detection monitoring wells (MW-3B, 7, 9, 13, 15, 19, 20, 21, 26, 27, 28, 29, 30, 31, 32 and 33), and two background detection monitoring wells (MW-17 and MW-18).

The proposed changes to the existing groundwater monitoring system network are illustrated on Figure IIIH-A-1 and listed in Table 2-1. This major amendment permit application (for Permit No. MSW-1417D), proposes to retain 11 existing monitoring

wells, convert five existing piezometers to monitoring wells, install four new monitoring wells, and plug and abandon seven existing monitoring wells to accommodate the development of the lateral expansion areas and future perimeter drainage buildout.

As illustrated on Figure IIIH-A-1, and in accordance with Title 30 TAC §330.403, the proposed groundwater monitoring system network is designed with POC detection monitoring wells spaced less than 600-feet apart along a continuous approximately 8,100-foot-long point of compliance. A Groundwater Monitoring System Certification for the proposed network design is provided on page IIIH-A-4 in Appendix IIIH-A.

2.1.2.1 Point of Compliance Monitoring Wells

The existing system utilizes 16 POC monitoring wells which are located hydraulically downgradient of the permitted limits of waste (MW-3B, 7, 9, 13, 15, 19, 20, 21, 26, 27, 28, 29, 30, 31, 32 and 33). These existing POC monitoring wells are screened within Lower Sand unit and Bounding Shale unit sediments; except for MW-3B and MW-20 which are screened at shallower depths within the Upper Sand unit (spanning the Upper Sand and Bounding Shale unit contact). These two Upper Sand unit screened wells are strategically located near the lowest point of the landfill unit (MW-3B) and the lowest point immediately downgradient of the pre-Subtitle D fill area (MW-20). Monitoring wells MW-3B and MW-20 are paired with Lower Sand unit screened POC monitoring wells MW-26 and MW-21; respectively.

The proposed system network utilizes 18 POC monitoring wells by retaining 10 existing POC monitoring wells (MW-3B, MW-15, MW-20, MW-21, MW-26, MW27, MW-28, MW-29, MW-30, MW-31), converting four existing piezometers to POC monitoring wells (MW-35[PWCG-3], MW-37[PWCG-1], MW-38[PWCG-9], MW-41[PWCG-12]), and installing four new POC monitoring wells (MW-36, MW-39, MW-40, and MW-42) as shown on Figure IIIH-A-1 in Appendix IIIH-A.

At least two years prior to waste placement in Sector 13 or Sector 14, monitoring wells MW-34, MW-35, and MW-37 will be converted from their former piezometer designations, new monitoring well MW-36 will be installed, and the wells will begin quarterly background data collection monitoring in accordance with Section 5.3. Existing monitoring wells MW-18 and MW-19 will be plugged and abandoned following background data collection completion and TCEQ acceptance of the background data statistical for monitoring wells MW-34 through MW-37.

At least two years prior to the development of Sector 12, monitoring wells MW-38 and MW-40 will be converted from their former piezometer designations, new monitoring wells MW-39, MW-40, and MW-42 will be installed, and the wells will begin quarterly background data collections monitoring in accordance with Section 5.3. Existing POC monitoring wells MW-7, MW-9, MW-13, MW-32, and MW-33 will be plugged and abandoned following the completion of background data collection

and TCEQ acceptance of the background data statistical evaluation for monitoring wells MW-38 through MW-43.

2.1.2.2 Background Monitoring Wells

The existing system utilizes two background monitoring wells (MW-17 and MW-18) which are located hydraulically upgradient from the permitted limits of waste. Monitoring well MW-18 is screened within Lower Sand unit and Bounding Shale unit sediments and monitoring well MW-17 is screened at shallower depths within the Upper Sand unit.

The proposed system network utilizes two background monitoring wells (MW-17 and MW-34) by retaining existing Upper Sand unit screened background monitoring well MW-17, and converting existing Lower Sand unit screened piezometer PWCG-4 to background monitoring well MW-34 as shown on Figure IIIH-A-1 in Appendix IIIH-A.

At least two years prior to waste placement in Sector 13 or 14, replacement background monitoring well MW-34 will be converted from piezometer PWCG-4 and begin quarterly background data collection monitoring in accordance with Section 5.3. Monitoring well MW-18 will be plugged and abandoned following the completion of background data collection and TCEQ acceptance of the background data statistical evaluation for monitoring well MW-34.

Collectively, background monitoring wells MW-17 and MW-34 will provide representative background groundwater quality data applicative to all POC detection monitoring wells in accordance with Title 30 TAC §330.403(a)(1). Monitoring well MW-17 will continue to provide background data which serves to support statistical analysis for comparably screened POC monitoring wells MW-3B and MW-20. Monitoring well MW-34 will provide background data which serves to support statistical analysis for the facility's 16 comparably screened POC detection monitoring wells.

Table 2-1
Groundwater Monitoring Well Network

Well Name	Gradient Position	Current Condition	System Status
MW-3B	POC	Existing MW	Retained in system
MW-7	POC	Existing MW	To be removed from system
MW-9	POC	Existing MW	To be removed from system
MW-13	POC	Existing MW	To be removed from system
MW-15	POC	Existing MW	Retained in system
MW-17	BG	Existing MW	Retained in system
MW-18	BG	Existing MW	To be removed from system
MW-19	POC	Existing MW	To be removed from system
MW-20	POC	Existing MW	Retained in system
MW-21	POC	Existing MW	Retained in system
MW-26	POC	Existing MW	Retained in system
MW-27	POC	Existing MW	Retained in system
MW-28	POC	Existing MW	Retained in system
MW-29	POC	Existing MW	Retained in system
MW-30	POC	Existing MW	Retained in system
MW-31	POC	Existing MW	Retained in system
MW-32	POC	Existing MW	To be removed from system
MW-33	POC	Existing MW	To be removed from system
MW-34	BG	Existing Piezometer PWCG-4	To be converted to MW (Replacement for MW-18)
MW-35	POC	Existing Piezometer PWCG-3	To be converted to MW
MW-36	POC	Future MW	To be installed as new MW
MW-37	POC	Existing Piezometer PWCG-1	To be converted to MW
MW-38	POC	Existing Piezometer PWCG-9	To be converted to MW
MW-39	POC	Future MW	To be installed as new MW
MW-40	POC	Future MW	To be installed as new MW
MW-41	POC	Existing Piezometer PWCG-12	To be converted to MW
MW-42	POC	Future MW	To be installed as new MW

MW = Groundwater Monitoring Well.
POC = Point of compliance monitoring well located hydraulically downgradient from waste.
BG = Background monitoring well located hydraulically upgradient from waste.

2.2 Monitoring Well Design and Maintenance

Well location coordinates, nearest ground elevations, and top of casing elevations and well construction details for the facility's existing groundwater monitoring wells and future piezometer to monitoring well conversions were obtained from WCG asbuilt survey reports, lithologic borehole logs, and monitor well data sheets (provided in Appendix IIIG of the SDP). Construction details for the facility's five new monitoring wells installations (MW-36, MW-28, MW-39, MW-42, and MW-43)

are estimated from the existing subsurface and topographic data. These data are summarized in Figure IIIH-A-2 (Groundwater Monitoring Well Details). Typical groundwater monitoring well specifications are depicted in Figure IIIH-A-3. Review of monitoring well installation records indicate that the facility's existing monitoring wells, and the existing piezometers scheduled for future conversion to monitoring wells, are constructed in accordance with the requirements of Title 30 TAC §330.421.

All parts of the groundwater monitoring system will be operated and maintained so that they perform to design specifications throughout the life of the monitoring program. Any monitoring well that is damaged to the extent that it is no longer suitable for sampling will be reported to the TCEQ who may make a determination about whether to repair or replace the well. Well plugging and abandonment will be performed by a Texas-licensed monitoring well driller in accordance with TCEQ and any other applicable regulatory requirements. No monitoring well will be plugged and abandoned without prior written authorization from TCEQ. Any replacement monitoring well installation will be performed in accordance with Title 30 TAC §330.421 by a Texas-licensed monitoring well driller.

2.3 Groundwater Monitoring Program

Facility detection monitoring wells will be sampled semi-annually for the detection monitoring parameters listed in 40 Code of Federal Regulations (CFR), Part 258, Appendix I, which are also listed in Table 5-1 in Section 5.1. Details regarding groundwater sampling, analyses, and statistical comparison procedures are discussed in the following sections of Appendix IIIH.

3 GROUNDWATER SAMPLING PROCEDURES

3.1 Health and Safety Plan

A health and safety plan is recommended for all groundwater sampling events at the landfill. Designing a Ground Water Sampling Health and Safety Plan is the responsibility of the party performing the actual field sampling work.

3.2 Sample Event Preparation and QA/QC

3.2.1 General Event Preparation

The laboratory performing the groundwater analysis will supply all necessary transportation coolers, pre-cleaned sample containers, quality assurance and quality control (QA/QC) trip blanks, chemical preservatives, sample container labels, custody seals, and chain-of-custody forms. All field data will be entered on a field data sheet (see example provided in Appendix IIIH-C) or an equivalent form. A specific contact person should be established at both the facility and contract laboratory for communication between the two parties.

3.2.2 Sample Container Selection

Each sample container will to be constructed of materials compatible and non-reactive with the sample it is designed to contain. Consult Appendix IIIH-D (Containerization and Preservation of Samples) to determine the number, type, and volume of appropriate containers. As noted in Section 3.2.1, the contract laboratory performing the analysis will supply all the required containers. Sample containers will be purchased as a pre-cleaned product or cleaned in the laboratory in a manner consistent with EPA protocols.

3.2.3 Equipment Preparation Prior to Site Arrival

Equipment preparation includes, at a minimum, decontamination procedures for water level indicators and field parameter (temperature, pH, specific conductivity, and turbidity) measurement devices. Operation and calibration of field instruments will be performed per the manufacturers' instructions.

- Water Level Indicators – Water level indicators will be decontaminated prior to initial site arrival by hand-washing the sensor probe and entire length of

tape in a laboratory grade non-phosphate detergent followed by a triple rinse with organic free deionized or distilled water.

- Field Parameter Measuring Devices – Field parameter measuring devices will be decontaminated by hand washing the sample cells in a laboratory grade non-phosphate detergent followed by a triple rinse with organic free deionized or distilled water. Meters will then be checked for proper calibration and operation as per the manufacturers' instructions. Any malfunctioning meters will be replaced prior to packing.

In the case of equipment failure, it is recommended that back-up instruments be in the sample crew's possession. If a back-up instrument is not available, then sampling will not proceed until the necessary properly functioning and calibrated replacement equipment is made available.

3.2.4 Field QA/QC Samples

Field QA/QC samples are used to identify sample contamination from the field, and/or shipping procedures, and document the precision of analytical processing by the laboratory. These blanks consist of one trip blank per sampling event, one field blank for each day of sampling, and one field duplicate per sampling event. A basic description of these field QA/QC samples follows:

- Trip Blank – samples will be prepared in the laboratory by filling the appropriate clean sample containers with organic-free water and adding the applicable chemical preservative, as indicated in Appendix IIIH-D. Trip blank samples will be shipped in the transportation cooler to the field and shipped back to the laboratory with the collected groundwater samples. The trip blank will be tested to detect any contamination that may occur as a result of the containers, sample coolers, cleaning procedures, or chemical preservatives used. Trip blank samples will be analyzed for the VOC constituents indicated in Table 5-1 of Section 5.1 at a minimum frequency of one per sampling event.
- Field Blank – sample containers will be collected in the field at a routine sample collection point by filling the appropriate sample containers with laboratory-grade distilled or deionized water. The field blank samples will be tested to detect contamination that may occur as a result of site ambient air conditions and serve as an additional check for contamination in sample containers or transport coolers. Field blanks samples will be collected and analyzed for the VOC constituents indicated in Table 5-1 of Section 5.1 at a frequency of one per day of sampling.
- Field Duplicate – a duplicate set of groundwater samples collected from a detection monitoring well and labeled with a non-existent well number so that the laboratory is unaware that the samples are duplicates. These samples are obtained by consecutively filling two sets of separate sample

containers with groundwater obtained from the same detection monitoring well and analyzing each set of samples independently. Field duplicate samples are useful in documenting the precision of sampling and analytical processes. Field duplicate samples will be collected in proper alternating order for each parameter (e.g. VOCs for the sample point container, VOCs for the field duplicate container, metals for the sample point container, metals for the field duplicate container, etc.). Field duplicate samples will be collected and analyzed for the total metal and VOC constituents indicated in Table 5-1 of Section 5.1 at a minimum frequency of one per sampling event.

Appropriate field QA/QC documentation will be recorded on the field data sheet; an example of which is included in Appendix IIIH-C.

3.3 Monitoring Well Inspection

During each monitoring event, every gauged well and its surface completion will be visually examined for anything unusual. This includes examination of the well casing, well head, protective cover, locking device, concrete pad, labels, etc. All observations will be recorded on the field data sheet. If any problems are discovered, they will be reported to the facility manager as soon as practical.

3.4 Monitoring Well Purging

3.4.1 General Well Purge Information

Purging a monitoring well is just as important as the subsequent sampling of the well. Over a certain period of time stagnant well water may become unrepresentative of formation water due to chemical and biochemical changes which alter water quality.

3.4.2 Water Level Measurement

Prior to purging each monitoring well, a water level measurement is required. The water level in each well will be gauged and recorded on the field data sheet. Water level indicator equipment will be constructed of chemically inert materials and will be decontaminated with a non-phosphate detergent, followed with a deionized or distilled water rinse, before use in each well. Water levels will be measured with a precision of +/- 0.01 foot. Groundwater elevations must be measured within a period of time short enough to avoid temporal variations in groundwater flow which could preclude an accurate determination of groundwater flow rate and direction. Water level measurements will be taken from the permanent datum point that will be clearly marked on the top of the well casing.

3.4.3 Purge Equipment and Procedures

Groundwater wells will be purged with disposable bailers or well-dedicated pumps to minimize cross contamination potential. Purge and decontamination/rinsate water will be collected in containers and disposed of in accordance with Section 3.4.6. Disposable, powderless gloves will be changed between wells and between purging and sampling to reduce the potential for cross-contamination and exposure to potentially contaminated groundwater.

3.4.3.1 Hand Bailing

Bailer purging will be conducted until field parameters are stable, three casing volumes of water have been removed, or the well is purged to dryness. Bailer purge field parameters include temperature, specific conductivity, pH, and turbidity.

A new bailer will be used to purge each monitoring well. If the well is not sampled immediately following purging, then a second new bailer will be used to collect the sample upon return to the well. All used bailers will be disposed of immediately following use. A bailer is considered contaminated and must be discarded for a new bailer if it comes in contact with any surface other than the groundwater being purged/sampled, bailing twine, well casing, sampler's nitrile gloves, or filling spout apparatus. Bailers must be constructed of Teflon, polypropylene, or polyethylene.

3.4.3.2 Dedicated Pumps

Samplers may employ either standard-flow purging/sampling techniques or low-flow purging/sampling techniques as deemed appropriate based on the well's recharge capacity/characteristics and the capability of the installed pump. Pump purging must be conducted until a minimum of two pump and tubing volumes of water have been removed. Non-low flow purging will be conducted until field parameters are stable, three casing volumes have been removed, or the well is purged to dryness. Low-flow purging will be conducted at a rate of approximately 50-250 milliliters per minute until field parameter stabilization is achieved. Pump purge field parameters include temperature, specific conductivity, pH, and turbidity.

Well-dedicated pumps will remain dedicated to each respective well throughout monitoring unless replacement is necessary due to damage or wear, in which case repairs will be completed or a new dedicated pump will be installed. Bladder pumps are recommended for well-dedicated pump installations.

3.4.3.3 Field Parameter Stabilization

Field parameter stabilization is defined by three consecutive measurements, taken at 3- to 5-minute intervals, which exhibit values within the following ranges:

- pH = ±0.2 standard units;
- Specific Conductivity = ±3%;

- Temperature = ±3%;
- Turbidity = ±10% or 3 consecutive readings <10 NTUs.

3.4.4 Purge Order

Based on water-level measurements taken prior to well purging, sampling will generally proceed from the well with the highest groundwater elevation to those with successively lower elevations unless contamination is known to be present. If contamination is present, monitoring wells not likely to be contaminated must be sampled before those that are known to be contaminated. The sampling sequence may be modified to accommodate unusual weather conditions or slow recovery wells.

3.4.5 Purge Volume Measurement

Purged water must be measured in a graduated container to accurately determine purge volume. The volume of water in the well casing can be calculated by subtracting the gauged depth to the water surface from the recorded total depth of the well casing. The volume of water contained in one foot of 2-inch diameter schedule 40 PVC well casing is 0.163 gallons. The total amount of water present in the well casing (one casing volume) can be calculated by multiplying the depth of water by the appropriate conversion value for the well's casing diameter (0.163 gallons/foot in this example). A well casing volume calculation example follows:

Total depth of well casing (feet)	41.50
Depth to groundwater (feet)	-12.36
Depth of water column (feet)	29.14
Gallons/feet of 2-inch casing	x 0.163
One casing volume of water (gallons)	4.75

3.4.6 Purge Water Management

All purge water and excess sample water will initially be collected in appropriate sealed containers. Contaminated purge water and excess sample water is considered contaminated if the concentration of any detected constituent statistically exceeds the constituent's background concentration. Contaminated purge water will be handled in the same manner as leachate. If needed, TCEQ will be consulted to assist in assessing proper disposal protocol. Uncontaminated groundwater may be discharged to the ground surface away from the well.

3.5 Monitoring Well Sample Collection

3.5.1 General Sample Collection Information

Sampling will take place within 24 hours of completion of purging. If field parameter stabilization is achieved, the well may be sampled immediately following stabilization. If after 24 hours, a slowly recharging well has not recovered sufficiently for a complete set of samples, a partial set of samples will be collected in the order specified in Section 3.5.2 until no more samples for the set can be collected.

3.5.2 Sample Collection Order

Samples will be collected and containerized according to the volatility of the required analyses. A specific collection order is as follows:

- Volatile Organic Compounds
- Semi-Volatiles (if collected)
- Total Metals
- Field Parameters
- Inorganics (if collected)

3.5.3 Sampling Equipment and Procedures

Groundwater samples will be collected with a new disposable bailer or well-dedicated purging/sampling pump (if installed). If a pump is used to sample, the pump controller will be adjusted to reduce the flow rate to between 100 and 250 ml/min for the duration of sampling. If a bailer is used to sample, sample containers will be filled by draining the bailer-collected groundwater from the bottom of the bailer. Special care will be taken to minimize sample agitation. All groundwater samples will be collected by filling directly into each of the required sample containers.

3.5.4 Sample Preservation

All samples will be containerized and preserved according to Appendix IIIH-D (Sample Containerization and Preservation). Preservation acids may be added to the applicable sample container in the field or pre-preserved by the laboratory prior to sample collection. Methods of preservation are intended to retard biological action, retard hydrolysis of chemical compounds and complexes, and reduce the volatility of constituents.

Samples requiring refrigeration to four degrees Centigrade, according to Appendix IIIH-D will be accomplished by placing the sample containers immediately into

coolers containing wet ice and delivering to the analytical laboratory as soon as practical. Groundwater samples for detection or assessment monitoring constituent analyses will not be filtered in the field or the laboratory.

3.5.5 Field Measurements

Required field measurements include water levels, temperature, pH, specific conductance, and turbidity. Water level measurement procedures are described in Section 3.4.2. Field parameters will be measured using either handheld instruments placed directly into discharged water or an in-line flow through cell. All instruments will be properly calibrated and checked with standards according to the manufacturer's instructions. Any improperly operating instruments must be replaced prior to continuing sample collection operations. Field parameter readings will be taken in a separate container not used for sample collection.

3.6 Record Keeping

3.6.1 Field Data Sheets

All field information will be completely and accurately documented and entered on a standard field data sheet, an example of which is provided in Appendix IIIH-C. Information recorded on the field data sheets will be provided in the sampling event's groundwater monitoring report, a copy of which will be included in the facility's Site Operating Record. All field data sheet entries will be made legible in indelible ink.

3.6.2 Chain-of-Custody/Sample Container Labels

Proper chain of custody records are required to insure the integrity of the samples and the conditions of the samples upon receipt at the laboratory, including the temperature of the samples at the time of login. The sample collector will fill in all applicable sections of the chain of custody and transmit the original, with the respective samples, to the laboratory performing the analysis. Upon receipt of the samples at the laboratory, the sample coordinator will complete the applicable receiving information on the chain of custody, make a copy for their files, and make the original documents part of the final analytical report (see Appendix IIIH-E for an example chain-of-custody form). Chain of custody form copies will be included in the sampling event's groundwater monitoring report, a copy of which will be included in the facility's Site Operating Record.

All sample containers will be labeled legibly to prevent misidentification. The following information will be indicated on each sample container label with waterproof pen:

- Collector's name, date, and time of sampling

- Sample source
- Sample Identification number
- Sample preservatives (if any)
- Analytical tests to be performed on the sample

3.7 Sample Transport

Samples will be transmitted from the field to the analytical laboratory either by hand delivery or via an overnight courier service. Samples are to be shipped with wet ice in insulated shipping containers capable of maintaining all samples at approximately four degrees centigrade. Before a shipping container is turned over to a common courier (or any other person who does not complete the chain-of-custody documentation), it will be sealed using a method that will reveal whether the container's security has been compromised. Overnight courier shipping containers must be of a sturdy water-proof design (ice chests are commonly used) equipped with adequate cushioning material to prevent sample container breakage during shipment.

4 LABORATORY PROCEDURES/PERFORMANCE STANDARDS

All groundwater analyses will be performed by a TCEQ-accredited environmental testing laboratory in accordance with acceptable accreditation standards (e.g. NELAC). All groundwater analytical data will be provided to TCEQ in the sampling event's groundwater monitoring report, a copy of which will be included in the facility's Site Operating Record.

The owner or operator will review all analytical data submitted under the requirements of this permit to ensure compliance with data quality objectives, prior to submittal of the data to the commission for review. This data review will include examination of the quality control results and other supporting information.

It is the responsibility of the owner or operator to ensure that the laboratory documents and reports all problems and anomalies observed that are associated with the analysis. If the analysis of the data indicates that it failed to meet the quality control goals for the laboratory's analytical program, it does not necessarily mean that the data is unusable. The owner or operator may still report the analytical data but will include a discussion of any issues identified by the laboratory.

A Laboratory Case Narrative (LCN) report for all problems and anomalies observed must be submitted by the owner and/or operator. A sample laboratory QC checklist is provided in Appendix IIIH-G. The LCN will report the following information:

1. State the exact number of samples, testing parameters and sample matrix.
2. The name of the laboratory involved in the analysis. If more than one laboratory is used, all laboratories will be identified in the case narrative.
3. State the test objective regarding samples.
4. Explain each failed precision and accuracy measurement determined to be outside of the laboratory and/or method control limits
5. Explain if the effect of the failed precision and accuracy measurements on the results induces a positive or negative bias.
6. Identify and explain problems associated with the sample results, along with the limitations these problems have on data usability.
7. A statement on the estimated uncertainty of analytical results of the samples when appropriate and/or when requested.

8. A statement of compliance and/or noncompliance with the requirements and specifications. Exceedance of holding times and identification of matrix interferences will be identified. Dilutions will be identified and if dilutions are necessary, they will be done to the smallest dilution possible to effectively minimize matrix interferences and bring the sample into control for analysis.
9. Identify any and all applicable quality assurance and quality control samples that will require special attention by the reviewer.
10. A statement on the quality control of the analytical method of the permit and the analytical recoveries information will be provided when appropriate and/or when requested.

In addition to the LCN, the following information will be submitted for all analytical data:

1. A table identifying the field sample name with the sample identification in the laboratory report.
2. Chain of custody.
3. An analytical report that documents the results and methods for each sample and analyte to be included for every analytical testing event. The test reports will document the reporting limit/method detection limit the laboratory used.
4. A release statement will be submitted from the laboratory. The statement will state "I am responsible for the release of this laboratory data package. This data package has been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist or Laboratory Case Narrative, and no information or data have been knowingly withheld that would affect the quality of the data."
    a. If it is an in-house laboratory, it will have the following statement: This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.
5. If the data is from soil and/or sediment samples, it will be reported on a dry weight basis with the percent solids and the percent moisture reported so that any back calculations of the wet analysis may be performed.

6. A laboratory checklist. The Laboratory Data Package Cover Page, and Laboratory Review Checklist or the laboratory quality assurance and quality control data and laboratory analytical data (which may be submitted in hard-copy or electronic format), will be included with the TCEQ-0312 forms for each groundwater monitoring event. For every response of "No, NA, or NR" that is reported on the checklist, the permittee will ensure the laboratory provides a detailed description of the "exception report" in the summary of the LCN or by adding additional explanations to the checklist. The permittee will require the laboratory to do an equivalent of an EPA Level 3 review regarding quality control analysis. The facility will explain any problems encountered in the laboratory analysis, either by adding additional explanations to the laboratory checklist or by extending the laboratory case narrative. Any information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the permittee.
7. If requested by TCEQ, laboratory analytical reports may be submitted either electronically or in hard copy.
8. The facility may explain any problems encountered in the laboratory analysis, either by adding additional explanations to the checklist or by extending the laboratory case narrative.
9. Any information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the permittee.

5 CONSTITUENTS, PQLS, AND DETECTION MONITORING

5.1 Analyzed Constituents

The detection monitoring constituents at the facility will be as referenced in Title 30 TAC §330.419 and specified in 40 CFR 258 Appendix I and Table 5-1. The laboratory will report the analytical results for each constituent to its respective practical quantitation limit (PQL) concentration. Groundwater samples will be collected and analyzed for the constituents listed in Table 5-1.

Table 5-1
Detection Monitoring Constituents

15 Total Metal Constituents[1]
Total Antimony
Total Arsenic
Total Barium
Total Beryllium
Total Cadmium
Total Chromium
Total Cobalt
Total Copper
Total Lead
Total Nickel
Total Selenium
Total Silver
Total Thallium
Total Vanadium
Total Zinc

[1] Analyses will be performed using the TCEQ – recommended EPA test methods or alternative methods with equivalent or better performance.

Table 5-1 (Continued)
Detection Monitoring Constituents

47 VOC Constituents[1]
Acetone
Acrylonitrile
Benzene
Bromochloromethane
Bromodichloromethane
Bromoform (Tribromomethane)
Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane (Ethyl Chloride)
Chloroform (Trichloromethane)
Dibromochloromethane (Chlorodibromomethane)
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dibromoethane (Ethylene Dibromide or EDB)
o-Dichlorobenzene (1,2-Dichlorobenzene)
p-Dichlorobenzene (1,4-Dichlorobenzene)
trans-1,4-Dichloro-2-butene
1,1-Dichloroethane (Ethylidene Chloride)
1,2-Dichloroethane (Ethylene Dichloride)
1,1- Dichloroethylene (Vinylidene Chloride)
Cis-1,2- Dichloroethylene (Cis-1,2- Dichloroethylene)
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)
1,2-Dichloropropane (Propylene Dichloride)
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethyl Benzene
2-Hexanone (Methyl Butyl Ketone or MBK)
Methyl Bromide (Bromomethane)
Methyl Chloride (Chloromethane)
Methylene Bromide (Dibromomethane)

1 Analyses will be performed using the TCEQ – recommended EPA test methods or alternative methods with equivalent or better performance.

Table 5-1 (Continued)
Detection Monitoring Constituents

47 VOC Constituents (Continued)[1]
Methylene Chloride (Dichloromethane)
Methyl Ethyl Ketone (2-Butanone or MEK)
Methyl Iodide (Iodomethane)
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone or MIBK)
Styrene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
Tetrachloroethylene (Tetracholorethane)
Toluene
1,1,1 Trichloroethane (Methylchloroform)
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene, TCE)
Trichloroflourmethane (CFC-11)
1,2,3-Trichloropropane
Vinyl Acetate
Vinyl Chloride
Xylenes

[1] Analyses will be performed using the TCEQ – recommended EPA test methods or alternative methods with equivalent or better performance.

5.2 Practical Quantitation Limit

The laboratory reporting limits will meet the requirements of Title 30 TAC §330.405(f)(5). Analytical results will be reported to the lowest concentration levels that can be reliably quantified (practical quantitation limits [PQL]). The following describes the PQL required:

- The PQL will be at or below the Ground Water Protection Standard (GWPS) concentration established for each analyte in accordance with Title 30 TAC §330.409(h), unless approved otherwise by the executive director.
- The PQL will be determined as the concentration that corresponds to the following precision and accuracy criteria:

Constituents/Chemicals of Concern	Precision (percent RSD)	Accuracy (percent recovery)
Metals	10	70-130
Volatiles	20	50-150
Semi-Volatiles	30	50-150

- The precision and accuracy of the PQL initially will be determined from the PQLs reported over the course of a minimum of eight groundwater monitoring events. The results obtained from these events will be used to demonstrate that the PQLs meet the specified precision and accuracy limits. The PQL may be updated as more data becomes available.
- The PQL will be supported by analysis of a PQL check sample, consisting of a laboratory reagent grade sample matrix spiked with constituents/chemicals of concern at concentrations equal to or less than the PQL. At a minimum, a PQL check sample will be performed quarterly during the calendar year to demonstrate that the PQL continues to meet the specified limits for precision and accuracy.
- Analytical results for data below the limit of detection ("non-detect" results) will be reported as less than the established PQL limit that meets those precision and accuracy requirements.
- If a PQL cannot be established according to the specified precision and accuracy limits, the owner or operator will ensure that the laboratory provides sufficient documentation to justify the alternate precision and accuracy limits. This information will be reported to the executive director by the owner or operator and will be evaluated on a case-by-case basis.

All samples will be analyzed within the required holding times for the particular analyses to be tested. A list of appropriate sample containers, sample preservation, and recommended holding times is presented in Appendix IIIH-D.

The sample containers will be filled in the following order.

1. VOCs
2. Semi-volatiles (if collected)
3. Total metals
4. Inorganics (if collected)

5.3 Background Data Collection

As stated in Title 30 TAC §330.405(b)(3)(A), the number of samples to be collected to establish background groundwater quality data for total metals will be consistent with the appropriate statistical procedures pursuant to Title 30 TAC §330.405(f). Following installation of a new monitoring well or conversion of an existing piezometer into a monitoring well, the facility will begin background data collection monitoring for the constituents listed in Table 5-1. Background data collection monitoring events will be conducted on a quarterly basis until a minimum of eight background data collection monitoring events have been completed.

Following the completion of background data collection for a given monitoring well, the total metals analytical data will be evaluated to ensure that the data are representative of background groundwater constituent concentrations unaffected by waste management activities or other sources of contamination in accordance with Title 30 TAC §330.405(d) and §330.407(a). At a minimum the statistical evaluation will include a screening for potential outliers and analyses to identify significant trends. The evaluation will be documented in a report and submitted to TCEQ prior to the facility's next scheduled semiannual groundwater detection monitoring event.

5.4 Updating Background Data

The collection of groundwater samples to establish background water quality data for metals constituents will be performed in accordance with Title 30 TAC §330.405(d) and §330.407(a).

For interwell total metals statistical comparisons, ongoing analytical data obtained from each monitoring event will be incorporated into the background data pool. Data will be evaluated for potential outliers prior to incorporation into the well's background data pool.

For intra-well statistical comparisons, new data may be incorporated into background as frequently as once every two years. The facility will evaluate the data to ensure that the data are representative of background groundwater constituent concentrations unaffected by waste management activities or other sources of contamination. At a minimum the statistical evaluation will include a screening for potential outliers and analyses to identify significant trends and, if appropriate, the data will be incorporated into the well's background data pool. The evaluation will be documented in a report and submitted to the TCEQ prior to the facility's next scheduled semiannual groundwater detection monitoring event.

5.5 Detection Monitoring Events

Routine sampling and analysis for all facility background and point of compliance detection monitoring wells will be conducted on a semi-annual basis (every six months) for the constituents listed in Table 5-1.

5.6 Groundwater Reporting and Submittals

No later than 60 days following completion of each groundwater monitoring event, statistical analyses will be performed in accordance with Section 6 of Appendix IIIH. Groundwater reporting frequency and procedures will be conducted in accordance

with Title 30 TAC §330 Subchapter J, and TCEQ Guidelines for Groundwater Monitoring Report Submittals guidance (December 22, 2014).

5.6.1 Semiannual Detection Monitoring Reporting

In accordance with TCEQ reporting guidance, within 90 days after completion of each semiannual groundwater monitoring event, a semiannual groundwater detection monitoring report will be submitted that includes the following information, determined since the previously submitted semiannual report:

1. The landfill's groundwater sample and field quality control sample analytical data collected during the reporting year in hard-copy format on TCEQ Form-0312 (Groundwater Sampling Report) and in any other format requested by the TCEQ (e.g., electronic format);
2. The laboratory case narrative as described in Section 4 and either:
   a) A completed laboratory checklist equivalent to the example checklist presented in Appendix IIIH-G, or
   b) The laboratory quality assurance and quality control data and laboratory analytical data (which may be submitted in hard-copy or electronic format);
3. An explanation of any problems encountered in the laboratory analysis, either by adding additional explanations to the laboratory checklist or by extending the laboratory case narrative. Any information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the landfill;
4. A statement regarding identification of any statistical exceedances;
5. The results of all groundwater monitoring, testing, and analytical work, including a summary of background groundwater quality values, groundwater monitoring analyses, statistical calculations, graphs, and drawings;
6. The groundwater flow rate and direction in the uppermost aquifer, using the preceding semiannual sampling event's data. The report will include all documentation used to determine the groundwater flow rate and direction;
7. A contour map of piezometric water levels in the uppermost aquifer based on concurrent measurements in all gauged facility wells. The report will include all data or documentation used to establish the contour map;
8. Recommendation for any changes; and
9. Any other items requested by the Executive Director.

In accordance with Title 30 TAC 330.408(d), if it is determined that the detection monitoring system no longer satisfies the requirements of Title 30 TAC §330.407,

the facility will submit an application for a permit amendment or modification to make appropriate changes within 90 days of this determination.

5.6.2 Semiannual Assessment Monitoring Reporting

If there are one or more facility wells in assessment monitoring status, then the facility will submit a semiannual assessment monitoring report within 60 days after completion of each semiannual groundwater assessment monitoring event. The semiannual groundwater assessment monitoring report will include the same data and information required in the facility's semiannual detection monitoring report (as defined in Section 5.6.1), but will be specific to the facility's assessment monitoring wells, constituents, and statistics.

The required semiannual groundwater assessment monitoring information may be provided either within the facility's semiannual detection monitoring report or submitted in an assessment-specific semiannual groundwater report. If the required detection and assessment monitoring information are combined into a single semiannual report submittal, then the combined report will be submitted to TCEQ within 60 days after completion of the semiannual groundwater monitoring event.

6 STATISTICAL METHODOLOGY – GROUNDWATER DATA ANALYSES

6.1 Statistical Methodology

Statistical analyses of groundwater analytical data will be performed in accordance with Title 30 TAC §330.407 and §330.409, and EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance (March, 2009). Statistical comparisons will be performed using Sanitas™, a commercial software program developed by Sanitas Technologies, Inc. or other equivalent statistical program. Flow charts depicting statistical analyses protocols for control charts, prediction limits, and 95 percent confidence intervals are included in Appendix IIIH-F. It is not possible to predict all future potential circumstances. Therefore, alternate statistical methods may be used as deemed appropriate for the data distribution of the constituents being evaluated, providing that they conform to the requirements and guidelines set forth in Title 30 TAC §330.407 and §330.409, and EPA Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance (March, 2009).

6.2 Exceedances, Resampling, ASDs, and Assessment Monitoring

Detection monitoring for the constituents listed in Table 5-1 of Section 5.1 and referenced in Title 30 TAC §330.419(a) will be conducted in accordance with Sections 5.3 and 5.5. An Initial Statistical Exceedance (ISE) of any constituent will be based on a detected concentration that exceeds the constituent's statistical limit. If an ISE of any constituent is indicated at any detection monitoring well, a notice will be made to the TCEQ (and any other pollution control agency with jurisdiction that has requested to be notified) within 14 days.

6.2.1 Verification Resampling

Verification re-sampling is an integral part of the statistical methodology that is required to verify if an actual SSI has occurred. In the event that an ISE is indicated for any constituent listed in Table 5-1 (Section 5.1), verification resampling will be completed to either confirm or disconfirm the ISE. The verification resampling results will be submitted to TCEQ within the appropriate regulatory timeframe. If the ISE is verified through resampling then the verified exceedance constitutes a Statistically Significant Increase (SSI) and the facility will either:

(1) Notify the TCEQ (and any local pollution agency with jurisdiction that has requested to be notified) in writing of the verified SSI within 14 days and begin assessment monitoring within 90 days of the written notice (Title 30 TAC §330.407(b)(1)), or

(2) Within 14 days of the verified SSI determination date, notify the TCEQ (and any local pollution agency with jurisdiction that has requested to be notified) in writing of the facility's intent to submit an alternative source demonstration (ASD) report; and

(3) Within 90 days of the verified SSI determination, submit an ASD report to the TCEQ (and any local pollution agency with jurisdiction that has requested to be notified) that demonstrates that a source other than the facility caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality (Title 30 TAC §330.407(b)(3)(B)). The report must be prepared and certified by a qualified groundwater scientist. If the report does not sufficiently demonstrate an alternative contamination source to the TCEQ, then the facility must begin assessment monitoring with 90 days of the written ASD intent notification.

If the ASD is accepted by TCEQ then the monitoring well may remain in detection monitoring status. If the owner/operator does not make a demonstration satisfactory to the executive director within 90 days of the date of the SSI notice, as made evident by a letter of denial from TCEQ, then the owner/operator will initiate an assessment monitoring program meeting the requirements of Title 30 TAC §330.409.

6.3 Assessment Monitoring

Assessment monitoring will be conducted in accordance with Title 30 TAC §330.409. The landfill will sample and analyze the groundwater monitoring system for the full list of constituents in 40 CFR, Part 258, Appendix II. Analyses for these constituents will also be conducted for the each well located on either side of the well exhibiting the verified SSI, unless an alternative subset of wells is designated by the TCEQ.

For any new constituent detected in the point of compliance wells as a result of the completed Appendix II analysis, a minimum of four statistically independent samples from each background well will be collected and analyzed to establish background levels for the additional constituent, unless an alternative subset of Appendix II background constituent analyses is designated by the TCEQ. After sampling the assessment monitoring wells for Appendix II constituents, the TCEQ may specify an appropriate subset of wells to be sampled and analyzed for the Appendix II constituents during assessment monitoring and may delete any of the

Appendix II constituents if the landfill demonstrates that the constituents are not reasonably expected to be in or derived from the waste contained in the unit.

6.4 Corrective Action Monitoring

Detection of assessment monitoring constituents at statistically significant levels, as defined in Title 30 TAC §330.409, could result in corrective action monitoring. Groundwater monitoring for the purpose of corrective action assessment and remediation will be conducted in accordance with Title 30 TAC §330.411 through §330.415, and in consultation with TCEQ.

7 GROUNDWATER ANALYTICAL RESULTS AND POTENTIAL RESPONSE ACTIONS

7.1 Groundwater Quality

Title 30 TAC §330.63(f)(5-7) require a comparison of the facility's groundwater analytical data to the specific constituents referenced in Title 30 TAC §330.419(a) and listed in 40 CFR, Part 258, Appendix I. The facility's historical groundwater analytical data for all existing Subtitle D monitoring wells is presented in Table IIIH-B-1 (total metals constituents) and Table IIIH-B-2 (Volatile Organic Compound constituents). The historical groundwater analytical data for the former Subtitle D groundwater monitoring wells is presented in Table IIIH-B-3 (total metals constituents) and Table IIIH-B-4 (Volatile Organic Compound constituents). The Carel Corporation conducts groundwater monitoring and statistical analyses for the facility. According to the Carel Corporation, all detection monitoring wells were exclusively in detection status as of September 2021.

7.2 Potential Contaminant Migration

In the unlikely occurrence of a release of leachate from the landfill unit, the most probable pathway for the migration of pollutants will occur vertically through the vadose zone and laterally into the saturated Bounding Shale and Lower Sand unit sediments of the uppermost aquifer. Once within the uppermost aquifer, pollutants would be transported within the uppermost aquifer and down gradient in the direction of groundwater flow toward the permitted Point of Compliance and network of existing groundwater detection monitoring wells.

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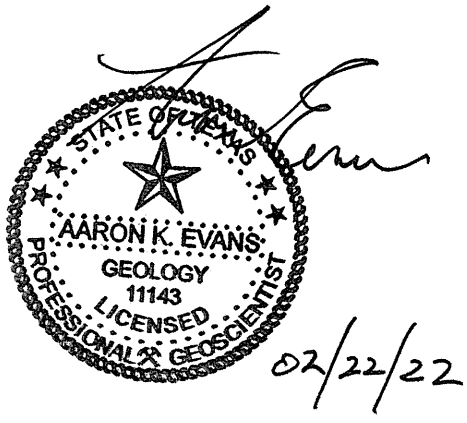
APPENDIX IIIH-A

GROUNDWATER MONITORING SYSTEM



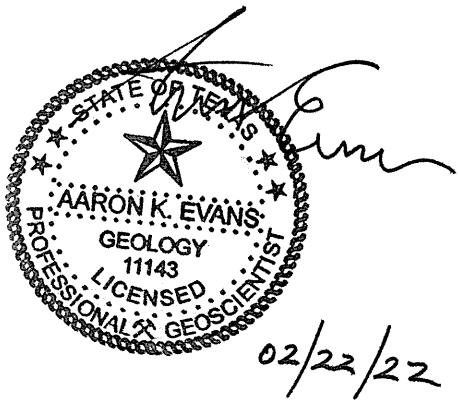
CONTENTS

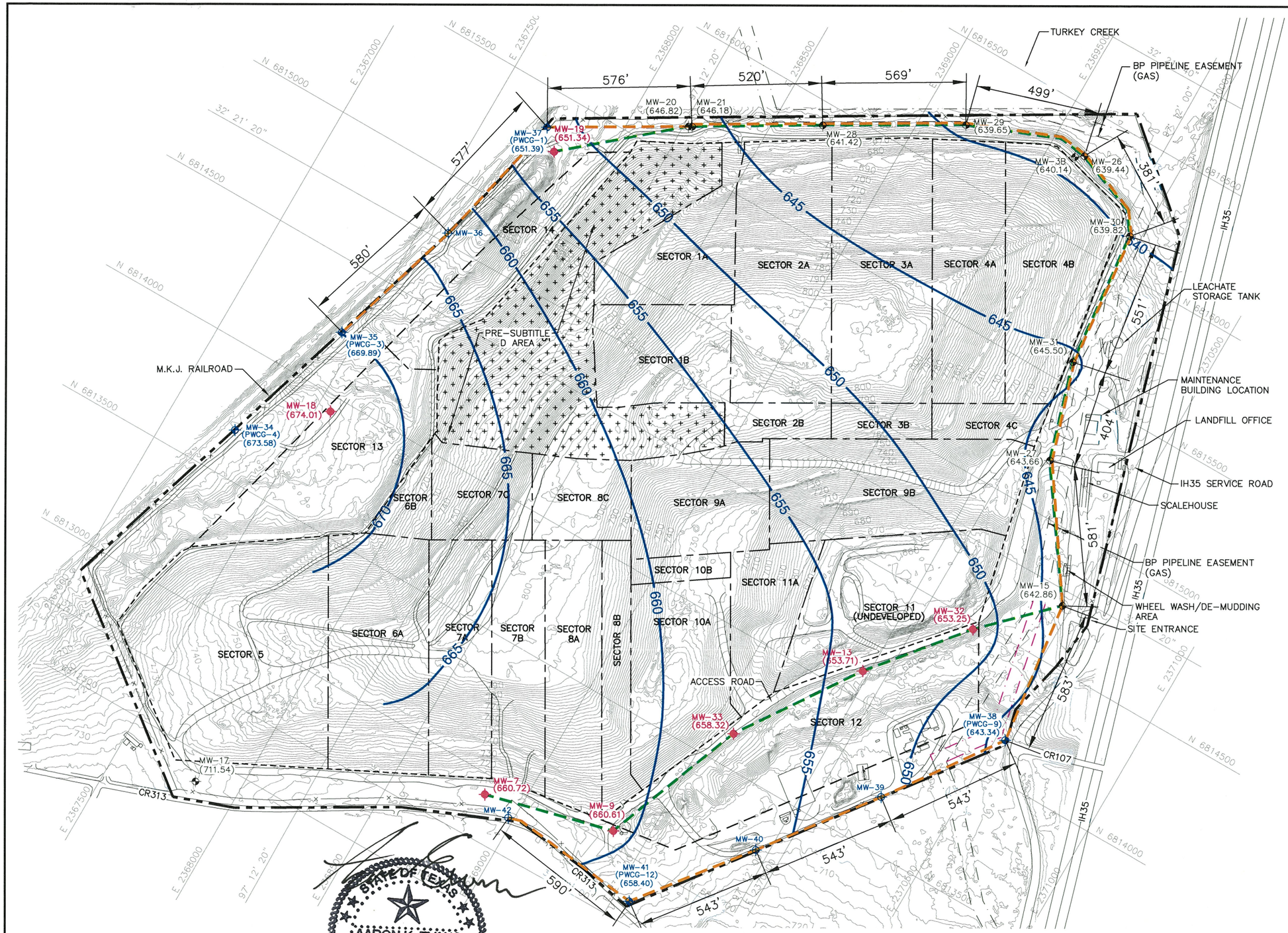
FIGURE IIIH-A-1 – Groundwater Monitoring System Layout
FIGURE IIIH-A-2 – Groundwater Monitoring Well Details
FIGURE IIIH-A-3 – Typical Monitoring Well Details

Groundwater Monitoring System Certification IIIH-A-4

WCG Groundwater Monitoring Well and Piezometer Asbuilt Survey Reports IIIH-A-5

Carel Corporation Groundwater Potentiometric Surface Maps IIIH-A-10





LEGEND

- PERMIT BOUNDARY
- PERMITTED LIMITS OF WASTE
- PROPOSED LIMITS OF WASTE
- 750 — EXISTING CONTOUR
- N 6816000 — STATE PLANE COORDINATE
- 32° 21' 20" — GEODETIC COORDINATE
- EXISITNG EASEMENT
- PROPOSED EASEMENT RELOCATION
- SECTOR BOUNDARY
- PRE-SUBTITLE D AREA
- MW-7 (660.72) — EXISTING GROUNDWATER MONITORING WELL (TO REMAIN) WITH GROUNDWATER ELEVATION POSTED IN FT-MSL
- MW-9 (660.61) — EXISTING GROUNDWATER MONITORING WELL (TO BE REMOVED) WITH GROUNDWATER ELEVATION POSTED IN FT-MSL
- MW-34 (PWCG-4) (673.58) — PROPOSED GROUNDWATER MONITORING WELL (TO BE CONVERTED FROM EXISTING PIEZOMETER) WITH GROUNDWATER ELEVATION POSTED IN FT-MSL
- MW-34 — PROPOSED GROUNDWATER MONITORING WELL (TO BE INSTALLED)
- 670 — UPPERMOST AQUIFER GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CONTOUR IN FT-MSL
- EXISTING POINT OF COMPLIANCE
- PROPOSED POINT OF COMPLIANCE

NOTES:

1. EXISTING CONTOURS AND ELEVATIONS PROVIDED BY FIRMATEK FROM AERIAL PHOTOGRAPHY FLOWN ON 01-08-2021. THE GRID SYSTEM IS TIED TO THE TEXAS STATE PLANE COORDINATE SYSTEM NORTH CENTRAL ZONE NAD 1983.
2. EXISTING MONITORING WELL AND PIEZOMETER LOCATION COORDINATES OBTAINED FROM AS-BUILT SURVEYS PERFORMED BY WEAVER CONSULTANTS GROUP IN 2020 AND 2021.
3. GROUNDWATER ELEVATIONS GAUGED BY WCG ON SEPTEMBER 15, 2021 AND POSTED IN FT-MSL BY EACH MONITORING WELL AND PIEZOMETER LOCATION.
4. MONITORING WELLS MW-3B, MW-17, AND MW-20 ARE SCREENED IN UPPER SAND UNIT SEDIMENTS AND HAVE NOT BEEN CONTOURED.
5. PROPOSED MONITORING WELLS WILL BE INSTALLED, OR CONVERTED FROM EXISTING PIEZOMETERS, AS LANDFILL IS DEVELOPED IN ACCORDANCE WITH SECTION 2.0, FIGURE IIIH-A-2, AND FIGURE IIIH-A-3 OF THE FACILITY'S GWSAP.

STATE OF TEXAS
AARON K. EVANS
GEOLOGY
11143
LICENSED
PROFESSIONAL GEOSCIENTIST
02/22/22

- [ ] DRAFT
- [X] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION

DATE: 02/2022
FILE: 0771-368-11
CAD: IIIH-A-1-GW SYSTEM LAYOUT.DWG

DRAWN BY: JDW
DESIGN BY: AKE
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT GROUNDWATER MONITORING SYSTEM LAYOUT

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIH-A-1

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O:\0771\368\EXPANSION 2021\PART III\IIIH\IIIH-A-1-GW SYSTEM LAYOUT.dwg, rarrington, 1:2

MONITORING WELL NAME	BACKGROUND (BG) OR POINT OF COMPLAINCE (POC) WELL?	INSTALL DATE	NAD 83 STATE PLANE COORDINATES		TOP OF CASING ELEVATION	GROUND ELEVATION	MONITORING WELL CONSTRUCTION DEPTHS				MONITORING WELL CONSTRUCTION ELEVATIONS				GROUNDWATER ELEVATION[4]
			NORTHING	EASTING			TOP OF FILTER PACK	TOP OF SCREEN	BOTTOM OF SCREEN	BOTTOM OF FILTER PACK	TOP OF FILTER PACK	TOP OF SCREEN	BOTTOM OF SCREEN	BOTTOM OF FILTER PACK	
EXISTING MONITORING WELLS - TO REMAIN IN SYSTEM															
MW-3B[5]	POC	Oct-90	6816304.53	2369610.69	671.04	670.0	27.6	29.6	39.6	39.9	642.4	640.4	630.4	630.1	640.14
MW-15	POC	Dec-93	6814727.75	2370465.60	676.80	674.4	60.0	63.0	68.0	69.0	614.4	611.4	606.4	605.4	642.86
MW-17	BG	May-95	6812392.27	2367830.51	729.55	727.6	16.5	17.7	22.7	23.5	711.1	709.9	704.9	704.1	711.54
MW-20	POC	May-95	6815639.26	2368219.11	660.96	659.1	11.8	13.5	18.5	19.0	647.3	645.6	640.6	640.1	646.82
MW-21	POC	May-95	6815645.65	2368231.68	660.84	659.1	27.3	33.8	43.8	45.0	631.8	625.3	615.3	614.1	646.18
MW-26[5]	POC	May-95	6816325.71	2369640.88	663.95	661.4	36.0	39.5	49.5	50.0	625.4	621.9	611.9	611.4	639.44
MW-27	POC	May-95	6815204.53	2370131.83	688.64	686.7	62.5	70.2	80.2	83.0	624.2	616.5	606.5	603.7	643.66
MW-28	POC	Oct-09	6815911.12	2368678.84	661.55	658.6	22.0	25.0	35.0	35.0	636.6	633.6	623.6	623.6	641.42
MW-29	POC	Oct-09	6816196.93	2369170.59	662.04	658.7	23.5	26.5	36.5	36.5	635.2	632.2	622.2	622.2	639.65
MW-30	POC	Oct-09	6816139.27	2369958.22	665.53	663.1	30.0	32.0	42.0	42.0	633.1	631.1	621.1	621.1	639.82
MW-31	POC	Oct-09	6815590.54	2370014.49	690.95	688.1	53.0	55.0	65.0	65.0	635.1	633.1	623.1	623.1	645.50
EXISTING MONITORING WELLS - TO BE REMOVED FROM SYSTEM															
MW-7	POC	Dec-93	6812923.65	2368851.92	710.96	709.1	45.0	58.0	68.0	69.0	664.1	651.1	641.1	640.1	660.72
MW-9	POC	Dec-92	6813054.66	2369368.04	702.20	700.3	33.0	49.0	74.0	74.0	667.3	651.3	626.3	626.3	660.61
MW-13[5]	POC	Dec-92	6814103.66	2369908.98	691.84	688.9	42.1	44.1	54.1	54.1	646.8	644.8	634.8	634.8	653.71
MW-18	BG	May-95	6813938.76	2367556.26	688.85	686.8	21.0	23.5	33.5	34.0	665.8	663.3	653.3	652.8	674.01
MW-19	POC	May-95	6815283.03	2367805.84	673.17	670.8	29.5	32.2	42.2	43.5	641.3	638.6	628.6	627.3	651.34
MW-32	POC	Oct-09	6814466.96	2370203.86	698.03	695.1	58.0	60.0	70.0	70.0	637.1	635.1	625.1	625.1	653.25
MW-33[5]	POC	Sep-09	6813628.83	2369587.47	705.73	702.0	61.6	63.6	73.6	73.6	640.4	638.4	628.4	628.4	658.32
PROPOSED MONITORING WELLS - TO BE ADDED TO SYSTEM															
MW-34 (PWCG-4)[6]	BG	Jul-21	6813684.57	2367265.44	704.65	704.6	33.0	35.4	45.4	50.0	671.6	669.3	659.3	654.6	673.60
MW-35 (PWCG-3)[6]	POC	Aug-21	6814236.20	2367438.65	692.71	689.6	28.0	30.9	40.9	50.0	661.6	658.7	648.7	639.6	669.90
MW-36[7]	POC	TBD	6814790.87	2367605.97	697.00	694.0	35.0	37.0	47.0	48.0	659.0	657.0	647.0	646.0	663.81
MW-37 (PWCG-1)[6]	POC	Aug-21	6815354.23	2367733.98	676.85	673.8	28.0	30.3	40.3	42.0	645.8	643.5	633.5	631.8	651.40
MW-38 (PWCG-9)[6]	POC	May-21	6814149.29	2370537.73	699.98	697.1	52.0	56.4	66.4	70.0	645.1	640.7	630.7	627.1	643.30
MW-39[7]	POC	TBD	6814727.75	2370465.60	702.00	705.0	48.0	51.0	66.0	67.0	657.0	654.0	639.0	638.0	652.52
MW-40[7]	POC	TBD	6813273.49	2369897.49	707.00	710.0	58.0	61.0	76.0	77.0	652.0	649.0	634.0	633.0	657.10
MW-41 (PWCG-12)[6]	POC	May-21	6812843.77	2369563.48	708.29	705.1	59.0	64.2	79.2	81.0	646.1	640.9	625.9	624.1	658.40
MW-42[7]	POC	TBD	6812890.50	2368980.40	709.00	711.0	45.0	55.0	70.0	71.0	666.0	656.0	641.0	640.0	660.70

NOTES:

1. ALL ELEVATIONS LISTED IN FEET ABOVE MEAN SEA LEVEL (FT-MSL); ALL DEPTHS LISTED IN FEET BELOW GROUND SURFACE (FT-BGS).
2. EXISTING MONITORING WELL COORDINATES, TOP OF CASING ELEVATIONS, AND GROUND ELEVATIONS OBTAINED FROM ASBUILT SURVEY CONDUCTED BY WEAVER CONSULTANTS GROUP IN JANUARY 2020.
3. MONITORING WELL COMPLETION DETAILS FOR EXISTING WELLS AND PROPOSED PIEZOMETER TO WELL CONVERSIONS OBTAINED FROM MONITOR WELL DATA SHEETS AND/OR LITHOLOGIC LOGS AND REFLECT ASBUILT CONDITION.
4. GROUNDWATER ELEVATIONS GAUGED BY WEAVER CONSULTANTS GROUP IN SEPTEMBER 2021.
5. EXISTING MONITORING WELLS MW-3B, MW-13, MW-26, AND MW-33 HAVE BEEN RAISED SINCE INITIAL INSTALLATION; LISTED INFORMATION REFLECTS ASBUILT CONDITION AS SURVEYED IN JANUARY 2020.
6. DETAILS FOR MONITORING WELLS PROPOSED FOR CONVERSION FROM EXISTING PIEZOMETERS OBTAINED FROM ASBUILT SURVEY CONDUCTED BY WCG IN SEPTEMBER 2021 WITH FORMER PIEZOMETER NAME LISTED IN PARENTHESIS.
7. DETAILS FOR PROPOSED FUTURE MONITORING WELLS MW-36, MW-39, MW-40, and MW-42 ESTIMATED FROM EXISTING SUBSURFACE INVESTIGATION DATA; ACTUAL DETAILS TO BE DETERMINED AT TIME OF INSTALLATION BASED ON SUBSURFACE CONDITIONS ENCOUNTERED.
8. TBD = TO BE DETERMINED.

STATE OF TEXAS
AARON K. EVANS
GEOLOGY
11143
LICENSED
PROFESSIONAL GEOSCIENTIST

02/22/22

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DATE: 02/2022
FILE: 0771-368-11
CAD: IIIH-A-2-WELL DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: AKE
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
GROUNDWATER MONITORING
WELL DETAILS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIH-A-2

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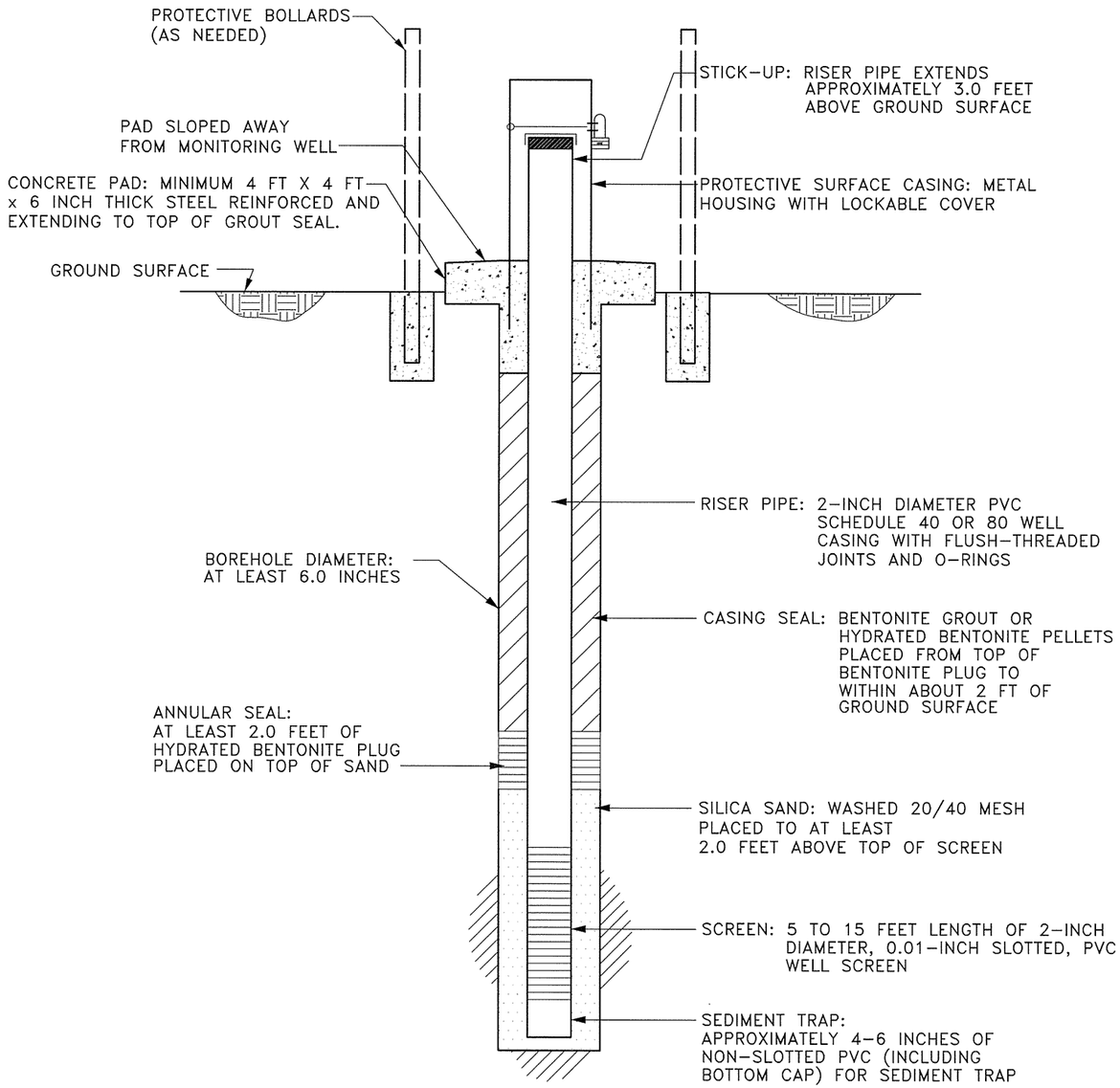
O:\0771\368\EXPANSION 2021\PART III\IIIH\IIIH-A-2-WELL DETAILS.dwg, rarrington, 1:2

TYPICAL GROUNDWATER MONITORING WELL DETAIL



NOT TO SCALE

STATE OF TEXAS
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11143
LICENSED
PROFESSIONAL GEOSCIENTIST

02/22/22

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FILE: 0771-368-11
CAD: IIIH-A-3-WELL DETAILS.DWG

DRAWN BY: JDW
DESIGN BY: AKE
REVIEWED BY: NT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
TYPICAL GROUNDWATER MONITORING WELL DETAILS

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

WWW.WCGRP.COM

FIGURE IIIH-A-3

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O:\0771\368\EXPANSION 2021\PART III\IIIH\IIIH-A-3-TYPICAL WELL DETAILS.dwg, rarrington, 1:2

GROUNDWATER MONITORING SYSTEM CERTIFICATION

General Site Information

Site: Turkey Creek Landfill

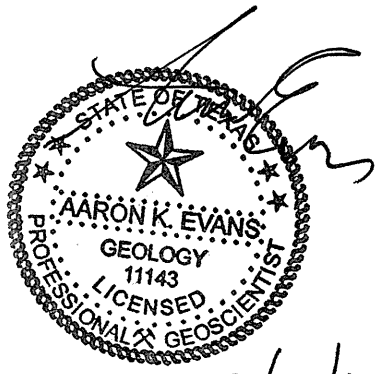
Site Location: Johnson County

MSW Permit No.: 1417D

Qualified Groundwater Scientist Statement

I, Aaron K. Evans, am a registered professional geoscientist in the State of Texas and a qualified groundwater scientist as defined in Title 30 TAC §330.3(120). I have reviewed the groundwater monitoring system and supporting details contained herein. In my professional opinion, the groundwater monitoring system design and construction details are in compliance with the groundwater monitoring requirements specified in Title 30 TAC §§330.401, 330.403, 330.405, 330.407, 330.409, 330.419, and 330.421. This system has been designed for the Turkey Creek Landfill. The only warranty made by me in connection with this document is that I have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of my profession, practicing in the same or similar locality. No other warranty, expressed or implied, is intended.

Firm/Address: Weaver Consultants Group, LLC
6420 Southwest Boulevard, Suite 206
Fort Worth, Texas 76109



Signature: _____

Aaron K. Evans, P.G., Texas License No. 11143

Date: 02/22/22

02/22/22

WCG GROUNDWATER MONITORING WELL AND PIEZOMETER ASBUILT SURVEY REPORTS

MONITOR WELL NUMBER	STATE PLANE COORDINATES (2)		GEODETIC COORDINATES (4)		TOP OF CASING	TOP OF LID (CLOSED)	TOP OF CONCRETE	GROUND ELEVATION
	NORTHING	EASTING	LATITUDE	LONGITUDE				
EXISTING POINT OF COMPLIANCE MONITORING WELLS								
MW-3B	6816304.53	2369610.69	32.35975654N	97.20096040W	671.04	672.68	670.07	670.0
MW-7	6812923.65	2368851.92	32.35048982N	97.20355262W	710.96	711.18	708.96	709.1
MW-9	6813054.66	2369368.04	32.35083237N	97.20187623W	702.20	702.57	699.39	700.3
MW-13	6814103.66	2369908.98	32.35369722N	97.20008265W	691.84	692.10	689.30	688.9
MW-15	6814727.75	2370465.60	32.35539361N	97.19825525W	676.80	677.03	674.67	674.4
MW-19	6815283.03	2367805.84	32.35701012N	97.20684574W	673.17	673.66	671.02	670.8
MW-20	6815639.26	2368219.11	32.35797524N	97.20549328W	660.96	661.49	658.92	659.1
MW-21	6815645.65	2368231.68	32.35799236N	97.20545230W	660.84	661.48	659.02	659.1
MW-26	6816325.71	2369640.88	32.35981371N	97.20086179W	663.95	664.22	661.48	661.4
MW-27	6815204.53	2370131.83	32.35671542N	97.19931690W	688.64	688.98	686.72	686.7
MW-28	6815911.12	2368678.84	32.35870687N	97.20399369W	661.55	661.98	658.82	658.6
MW-29	6816196.93	2369170.59	32.35947574N	97.20238987W	662.04	662.20	659.04	658.7
MW-30	6816139.27	2369958.22	32.35929049N	97.19984163W	665.53	665.77	662.61	663.1
MW-31	6815590.54	2370014.49	32.35778038N	97.19968140W	690.95	691.13	688.20	688.1
MW-32	6814466.96	2370203.86	32.35468573N	97.19911323W	698.03	698.16	695.07	695.1
MW-33	6813628.83	2369587.47	32.35240307N	97.20114274W	705.73	705.96	701.95	702.0
EXISTING BACKGROUND MONITORING WELLS (TO REMAIN)								
MW-17	6812392.27	2367830.51	32.34906391N	97.20688109W	729.55	729.88	727.74	727.6
MW-18	6813938.76	2367556.26	32.35332378N	97.20770748W	688.85	689.52	687.03	686.8
EXISTING BACKGROUND MONITORING WELLS (PROPOSED FOR REMOVAL FROM SYSTEM)								
MW-5B	6812659.67	2368293.55	32.34978318N	97.20537113W	717.06	717.27	716.08	715.9
MW-16	6813629.12	2367852.72	32.35246269N	97.20675987W	688.37	688.72	686.68	687.4

NOTES:

(1) COORDINATES AND ELEVATIONS SHOWN HEREON BASED UPON A FIELD SURVEY BY WEAVER CONSULTANTS GROUP, LLC ON 1/20/2020. (U.S. SURVEY FEET)

(2) COORDINATES ARE RELATIVE TO THE TEXAS COORDINATE SYSTEM OF 1983, NORTH AMERICAN DATUM 1983(2011), NORTH CENTRAL ZONE (4202). U.S. SURVEY FEET

(3) ELEVATIONS ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, AS HELD FIXED BY THE SITE BENCHMARK AT TURKEY CREEK LANDFILL.

(4) GEODETIC COORDINATES ARE BASED UPON WGS84 REFERENCE SYSTEM IN DECIMAL DEGREES.

(5) SITE BENCHMARK LOCATION: N: 6815705.77, E: 2370100.50, EL: 684.76 DESC: BRASS DISC IN CONC. CURB

SURVEYOR CERTIFICATION

THAT I, ANDREW J. WIDOLFF, A DULY REGISTERED PROFESSIONAL LAND SURVEYOR BY THE STATE OF TEXAS, AFFIRM THAT THIS DOCUMENT WAS PREPARED UNDER MY DIRECT SUPERVISION AND BASED UPON A FIELD SURVEY COMPLETED JANUARY 20, 2020.

DATED: JANUARY 20, 2020

STATE OF TEXAS REGISTERED ANDREW J. WIDOLFF 6771 PROFESSIONAL LAND SURVEYOR

1-20-2020

TXSURV FIRM: 10095400
TXSURV FIRM NAME: WEAVER CONSULTANTS GROUP, LLC
6420 SOUTHWEST BLVD STE 206
BENBROOK, TX 76109
817-735-9770

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DATE: 01/2020
FILE: 0771-388-11
CAD: IIIH-A-2A-WELL SURVEY.DWG

DRAWN BY: AJW
DESIGN BY: AJC
REVIEWED BY: MT

Weaver Consultants Group
TBPE REGISTRATION NO. F-3727

PREPARED FOR
TEXAS REGIONAL LANDFILL COMPANY, LP

REVISIONS		
NO.	DATE	DESCRIPTION
1	01/2020	ADDED NEW FIGURE

MAJOR PERMIT AMENDMENT
GROUNDWATER MONITORING
SYSTEM ASBUILT SURVEY

WWW.WCGRP.COM | FIGURE IIIH-A-2A

Z:\Waste Connections\Fig Key Creek\2020\IIIH-A-2A-WELL SURVEY.dwg, 1/20/2020 1:42

Weaver Consultants Group

6420 SOUTHWEST BLVD., STE. 206
FORT WORTH, TEXAS 76109
PHONE: (817) 735-9770
FAX: (817) 735-9775

MEMORANDUM

To: File

Date: October 28, 2021

From: Andrew Widolff, R.P.L.S.
Weaver Consultants Group, LLC

Project: 0771-368-11-123

Re: Piezometer As-Built Survey
Turkey Creek Landfill

Weaver Consultants Group, LLC has completed an as-built survey of 8 newly installed piezometers on September 10th and 22nd, 2021 at the Turkey Creek Landfill. The piezometer coordinates and elevations are tied to the site benchmark whose coordinates are N: 6,815,705.79, E: 2,370,100.50, and elevation 684.76, relative to the Texas Coordinate System of 1983, North American Datum of 1983(2011)[epoch 2010.00], North Central Zone, and North American Vertical Datum of 1988, all in US Survey Feet. These coordinates include:

Well ID	Northing	Easting	Elevation	Location
PWCG-1	6815354.21	2367734.00	677.02	Top of Protective Lid
	6815354.23	2367733.98	676.85	Top of PVC Casing
	6815352.77	2367733.68	673.92	Pad Monument
	6815352.50	2367732.38	673.85	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35720817N
			Longitude	97.20707552W
PWCG-2	6814739.27	2367642.29	697.39	Top of Protective Lid
	6814739.20	2367642.31	697.22	Top of PVC Casing
	6814740.27	2367641.49	694.20	Pad Monument
	6814741.74	2367642.23	694.26	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35552109N
			Longitude	97.20739699W
PWCG-3	6814236.21	2367438.62	692.90	Top of Protective Lid
	6814236.20	2367438.65	692.71	Top of PVC Casing
	6814235.11	2367439.33	689.98	Pad Monument
	6814233.94	2367438.11	689.63	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35414530N
			Longitude	97.20807655W

Weaver
Consultants
Group

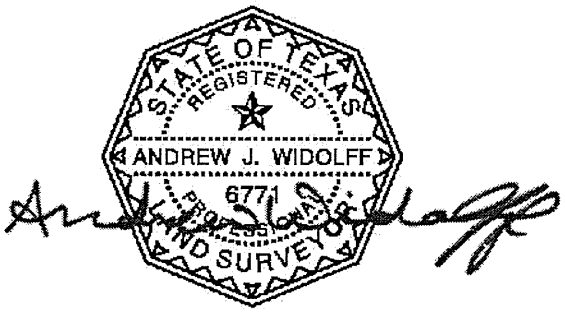
6420 SOUTHWEST BLVD., STE. 206
FORT WORTH, TEXAS 76109
PHONE: (817) 735-9770
FAX: (817) 735-9775

Well ID	Northing	Easting	Elevation	Location
PWCG-4	6813684.52	2367265.40	708.29	Top of Protective Lid
	6813684.57	2367265.44	708.03	Top of PVC Casing
	6813683.56	2367265.91	704.94	Pad Monument
	6813682.29	2367264.76	704.65	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35263482N
			Longitude	97.20865940W
PWCG-9	6814149.33	2370537.67	700.16	Top of Protective Lid
	6814149.29	2370537.73	699.98	Top of PVC Casing
	6814150.15	2370536.11	697.22	Pad Monument
	6814151.41	2370537.16	697.06	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35380134N
			Longitude	97.19804507W
PWCG-10	6813712.73	2370113.44	705.19	Top of Protective Lid
	6813712.69	2370113.39	704.93	Top of PVC Casing
	6813711.24	2370113.26	701.97	Pad Monument
	6813711.26	2370111.73	701.92	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35261576N
			Longitude	97.19943628W
PWCG-11	6813241.02	2369833.03	710.24	Top of Protective Lid
	6813240.98	2369833.06	710.06	Top of PVC Casing
	6813239.52	2369833.20	707.26	Pad Monument
	6813239.14	2369834.99	707.22	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35132881N
			Longitude	97.20036315W
PWCG-12	6812843.75	2369563.48	708.43	Top of Protective Lid
	6812843.77	2369563.48	708.29	Top of PVC Casing
	6812845.05	2369563.27	705.12	Pad Monument
	6812845.14	2369561.65	705.06	Nearest Ground Surface
	Geodetic Coordinates (WGS-84)		Latitude	32.35024605N
			Longitude	97.20125184W

SURVEYOR CERTIFICATION

That I, Andrew Widolff, a Registered Professional Land Surveyor by the State of Texas, do hereby affirm that this document was prepared under my direction supervision and is based on a field survey performed September 10th and 22nd, 2021. A table depicting as-built piezometer coordinates and elevations accompanies this certification.

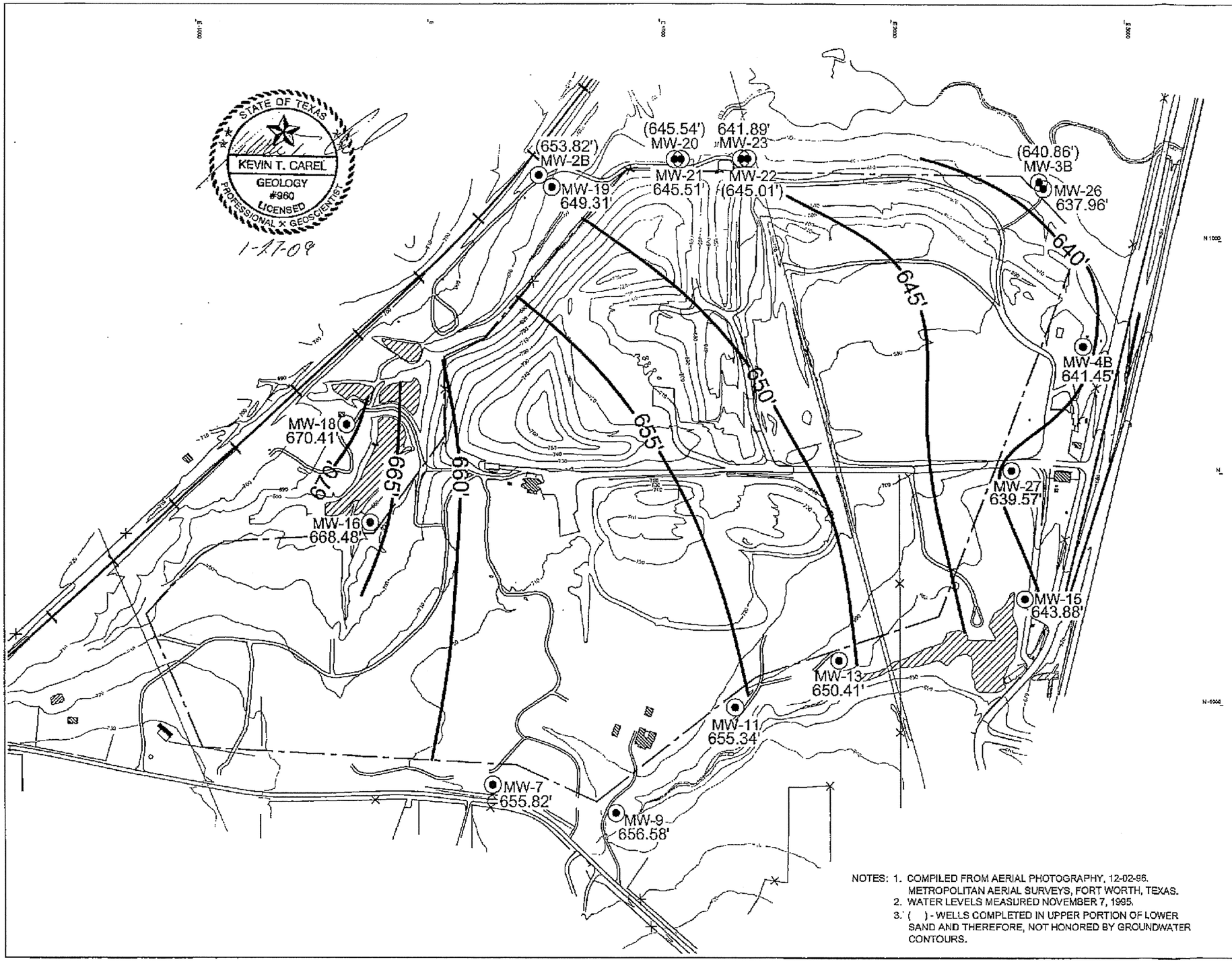
October 28, 2021



Andrew Widolff, RPLS #6771
Weaver Consultants Group, LLC
6420 Southwest Blvd, Suite 206
Fort Worth, TX 76103 (817) 735-9770
TBPELS Firm No. 10095400

CAREL CORPORATION

GROUNDWATER POTENTIOMETRIC SURFACE MAPS



NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 12-02-95. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED NOVEMBER 7, 1995.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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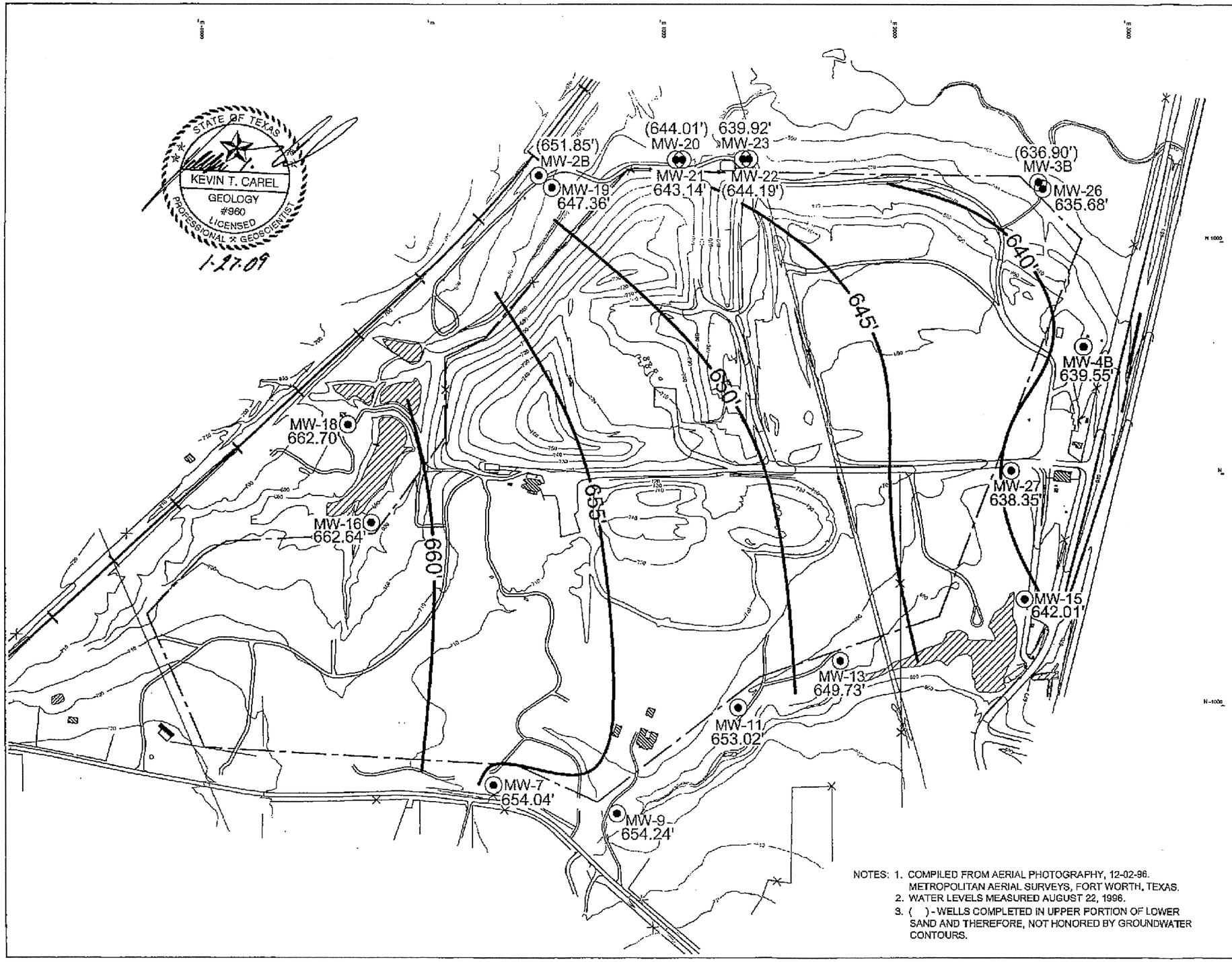
CHECKED BY: KTC	
APPROVED BY: KTC	



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
1-27-09

NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 12-02-96. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 22, 1996.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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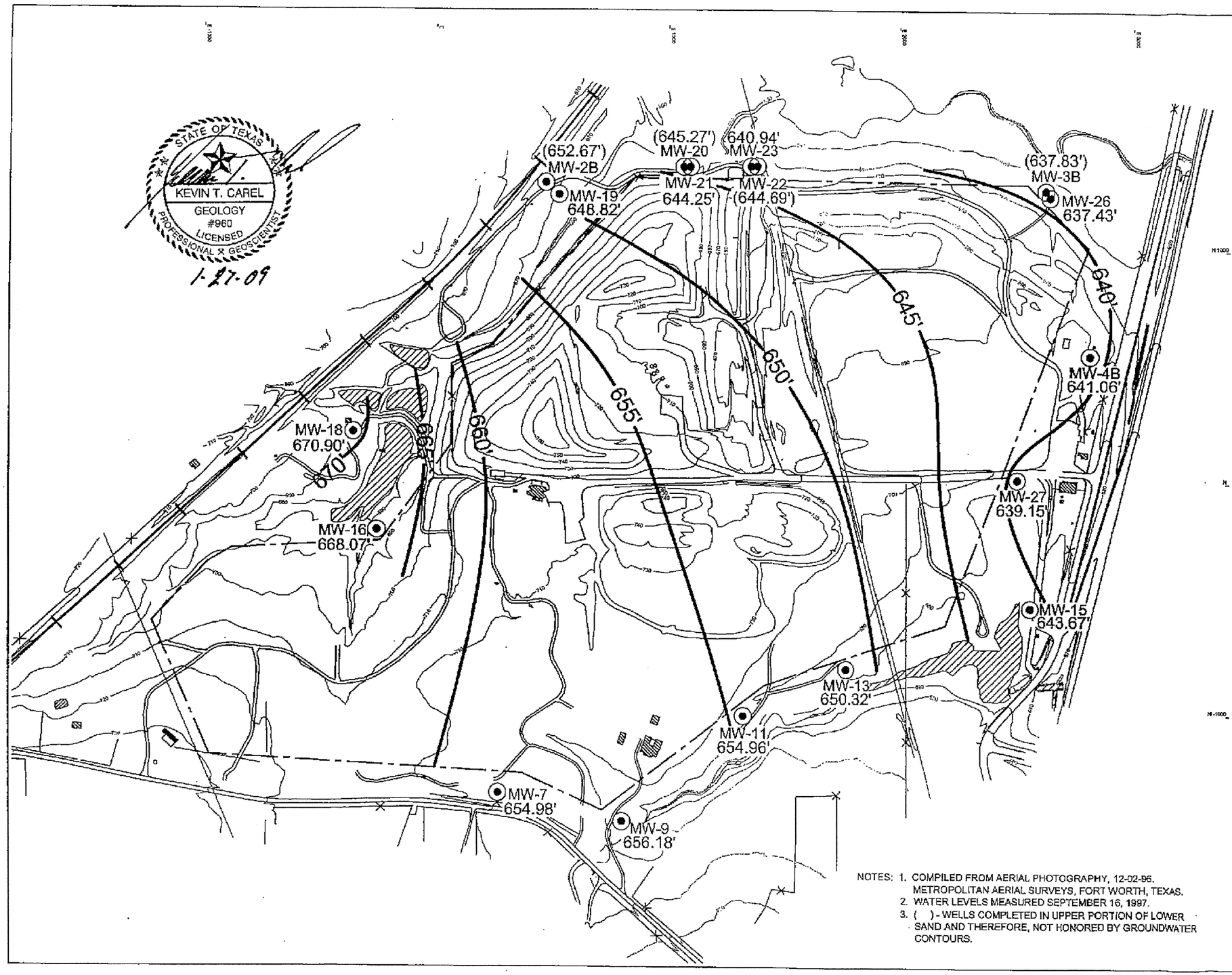
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 12-02-96. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 16, 1997.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 — EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400 FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 7, 2009	REV. NO.: 0
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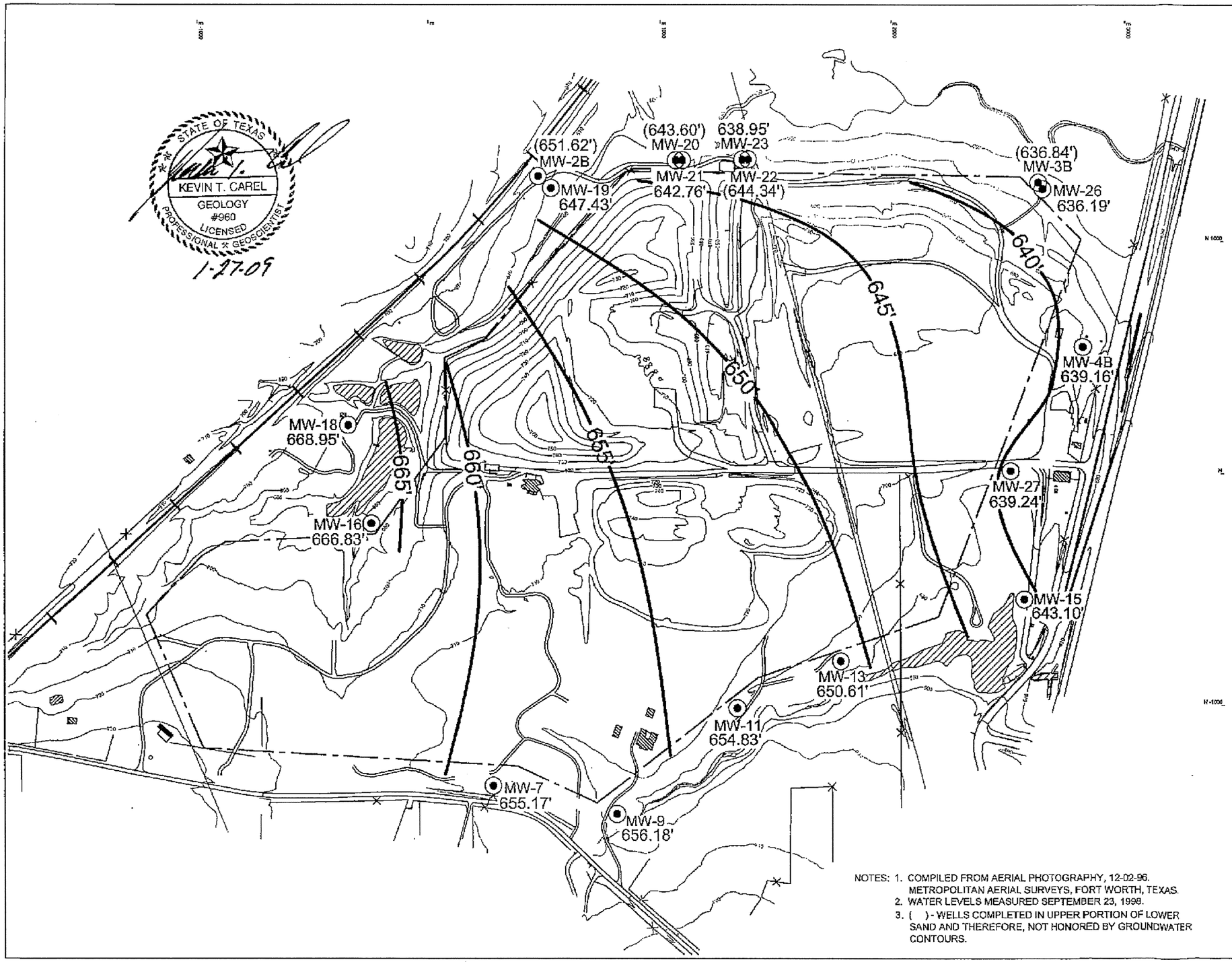
DESIGNED BY: JFZ	FIGURE:
DRAWN BY: TDW	E11D.2-3
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES: 1. COMPILED FROM AERIAL PHOTOGRAPHY, 12-02-96. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 23, 1998.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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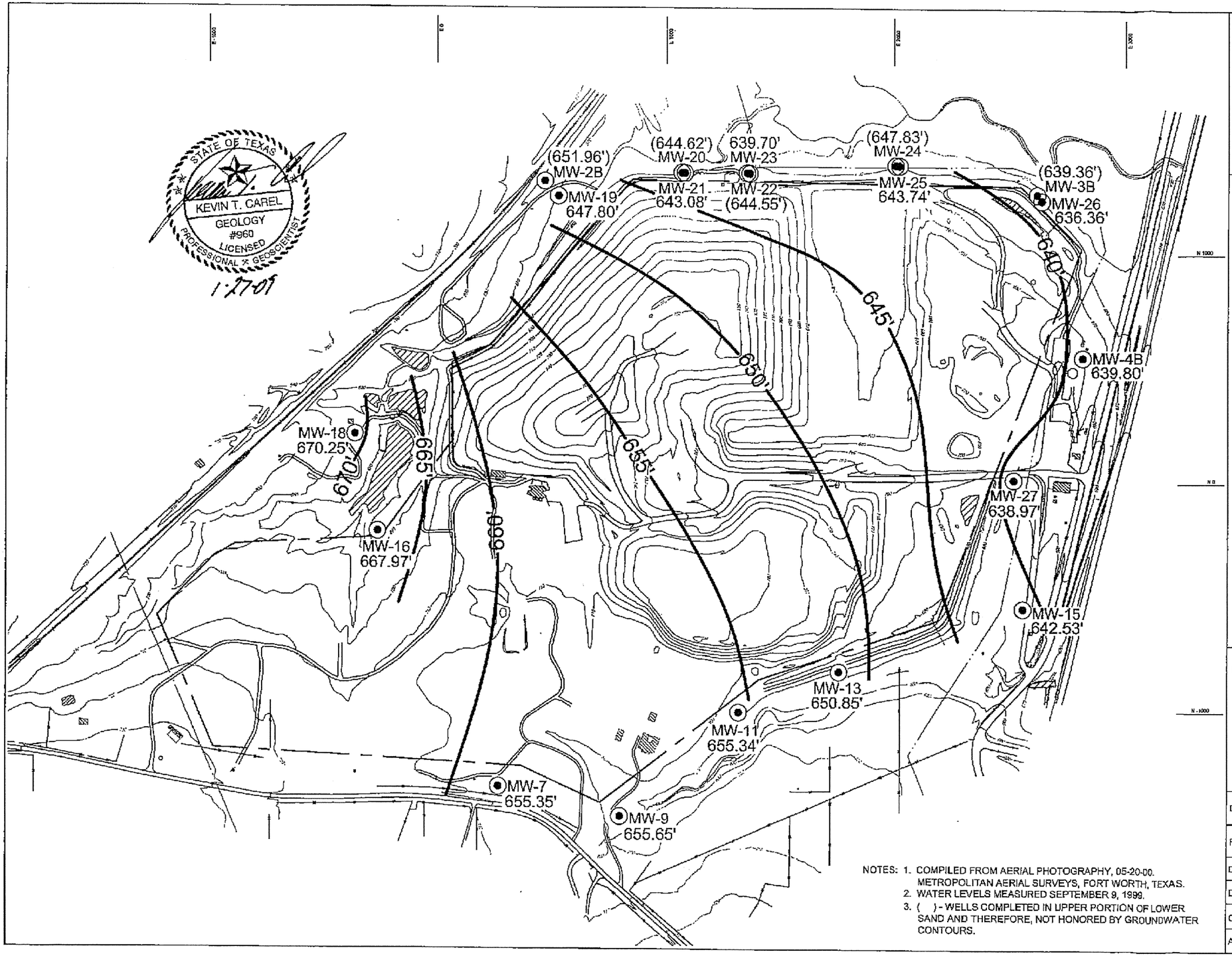
APPROVED BY: KTC	



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST
1-27-09

NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-20-00. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 9, 1999.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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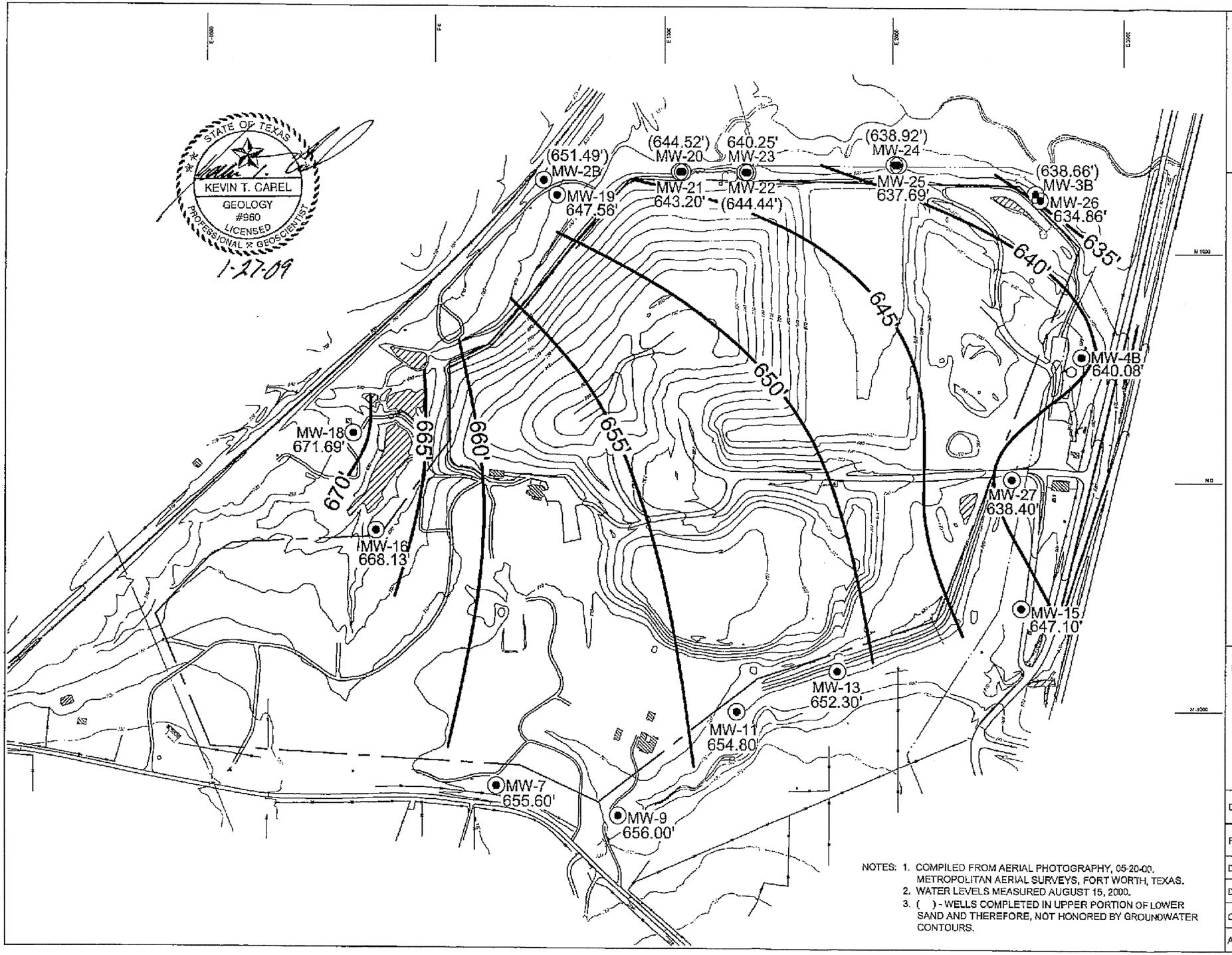
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-20-00, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 15, 2000.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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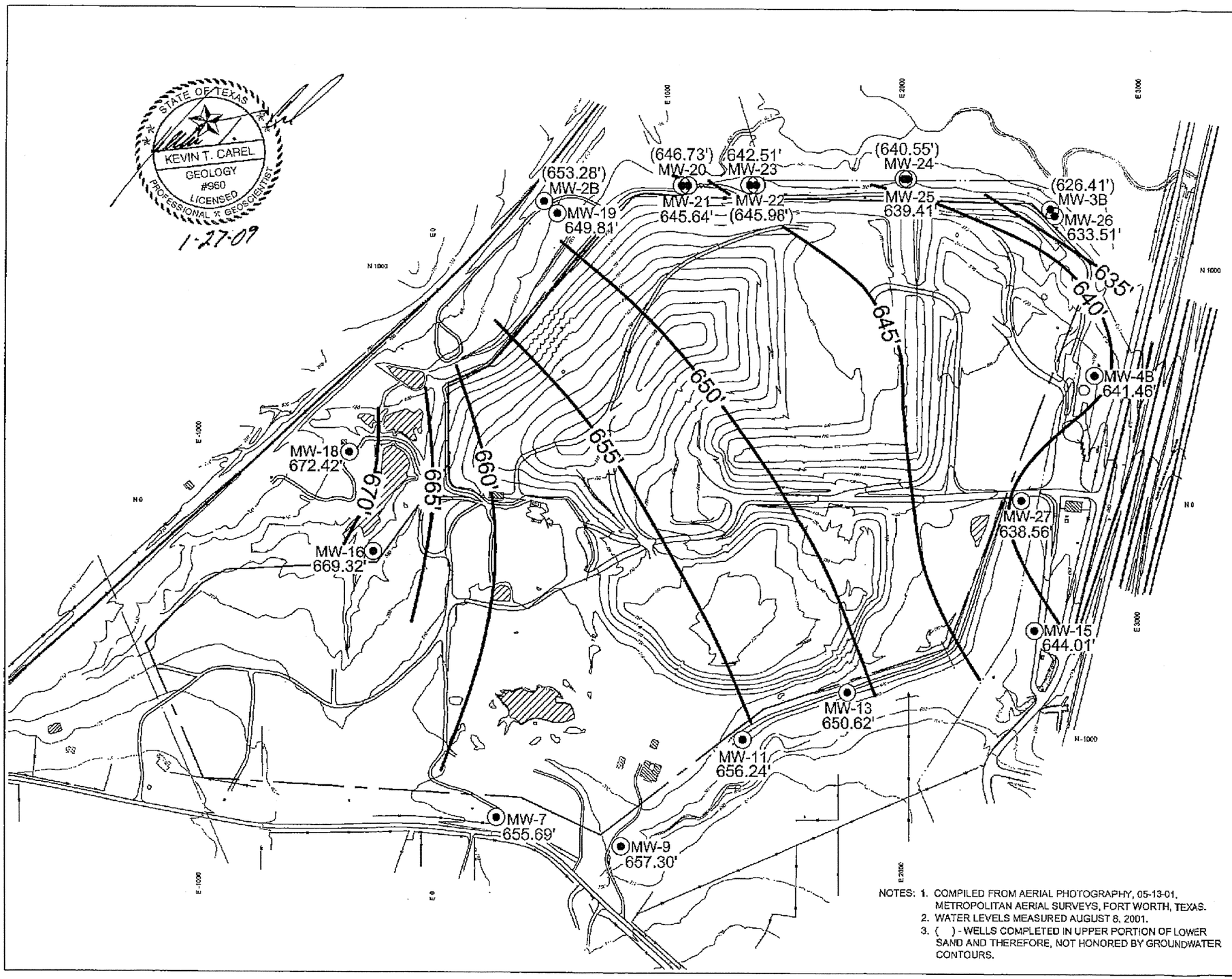
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-13-01, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 8, 2001.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 560 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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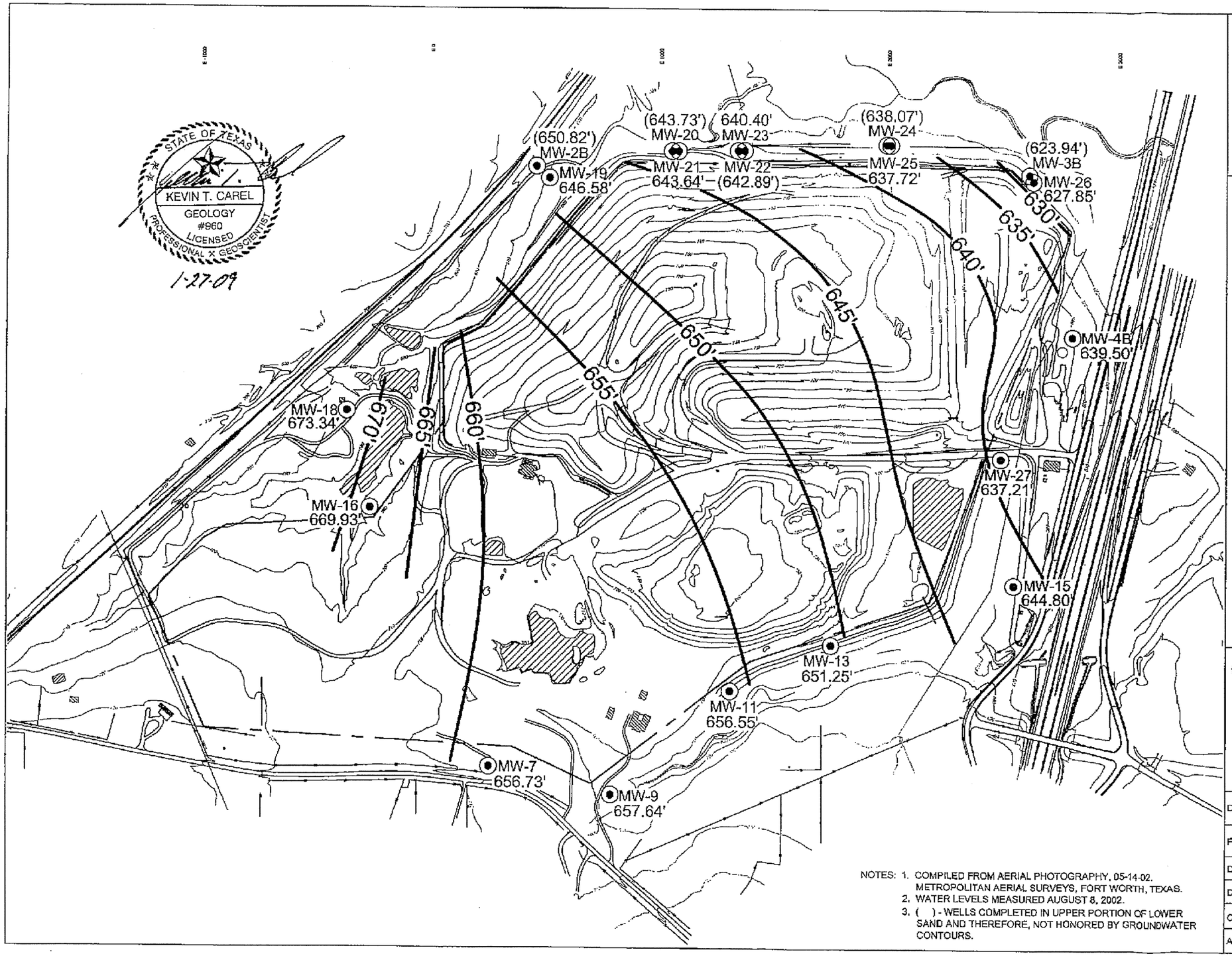
APPROVED BY: KTC	



STATE OF TEXAS
KEVIN T. CAREL
GEOLOGY
#960
LICENSED
PROFESSIONAL GEOSCIENTIST

1-27-09

NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-14-02. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 8, 2002.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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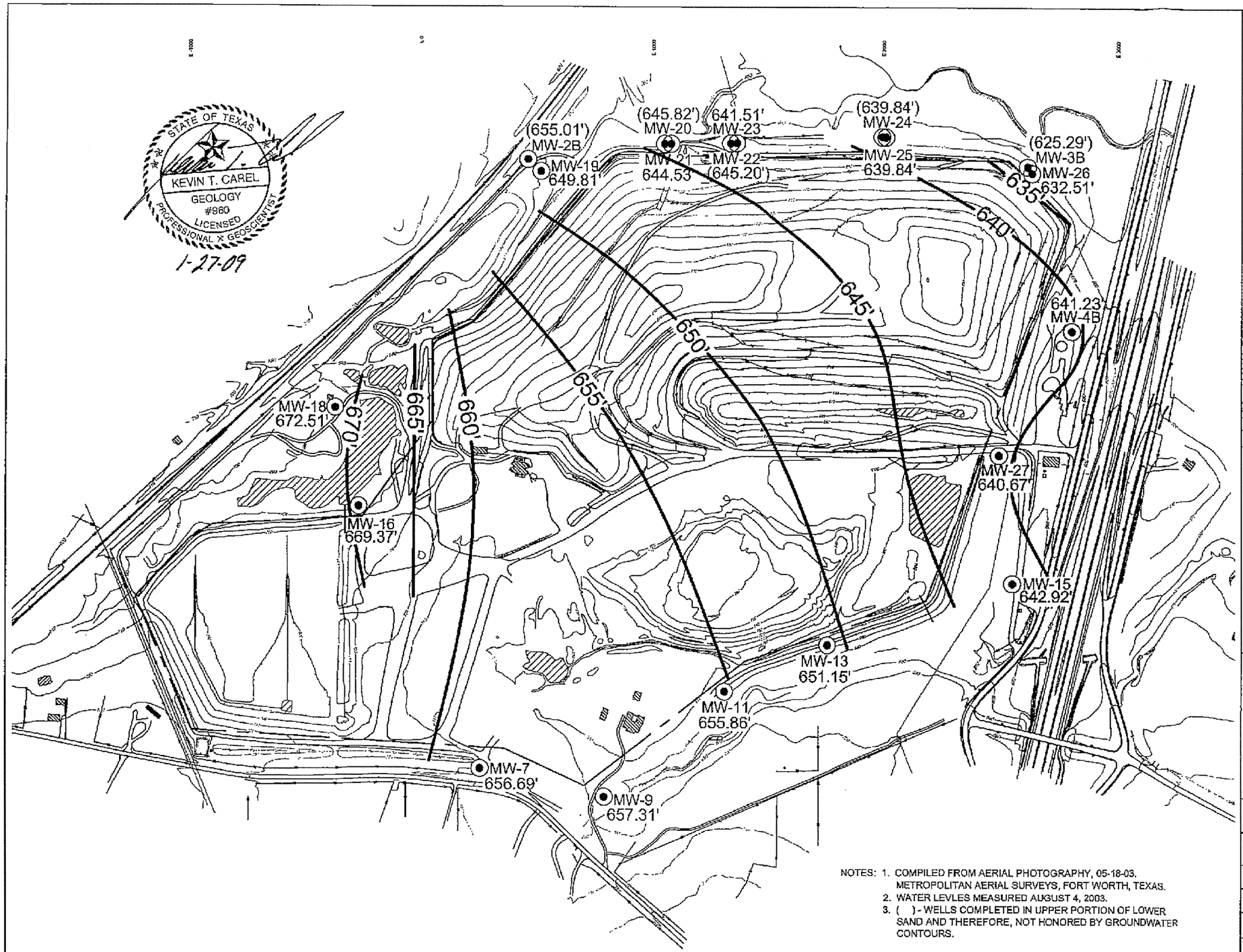
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-18-03. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVLES MEASURED AUGUST 4, 2003.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 350 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400 FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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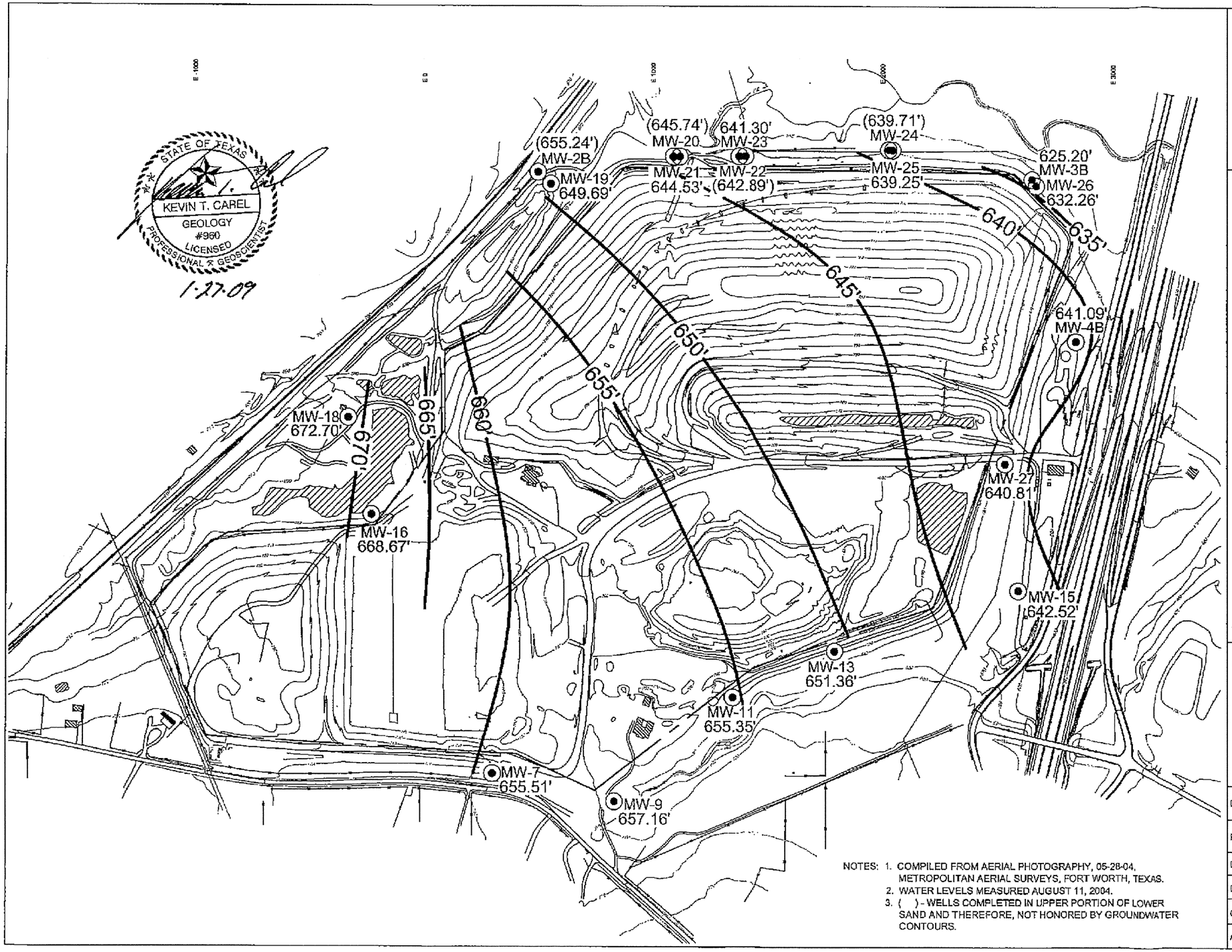
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-28-04, METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 11, 2004.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 28, 2009	REV. NO.: 0
FILENAME: L:\Texas\Turkey Creek\2007 TOPO\Permit MOD\fig\ NODFig E11D.2-10.dwg	
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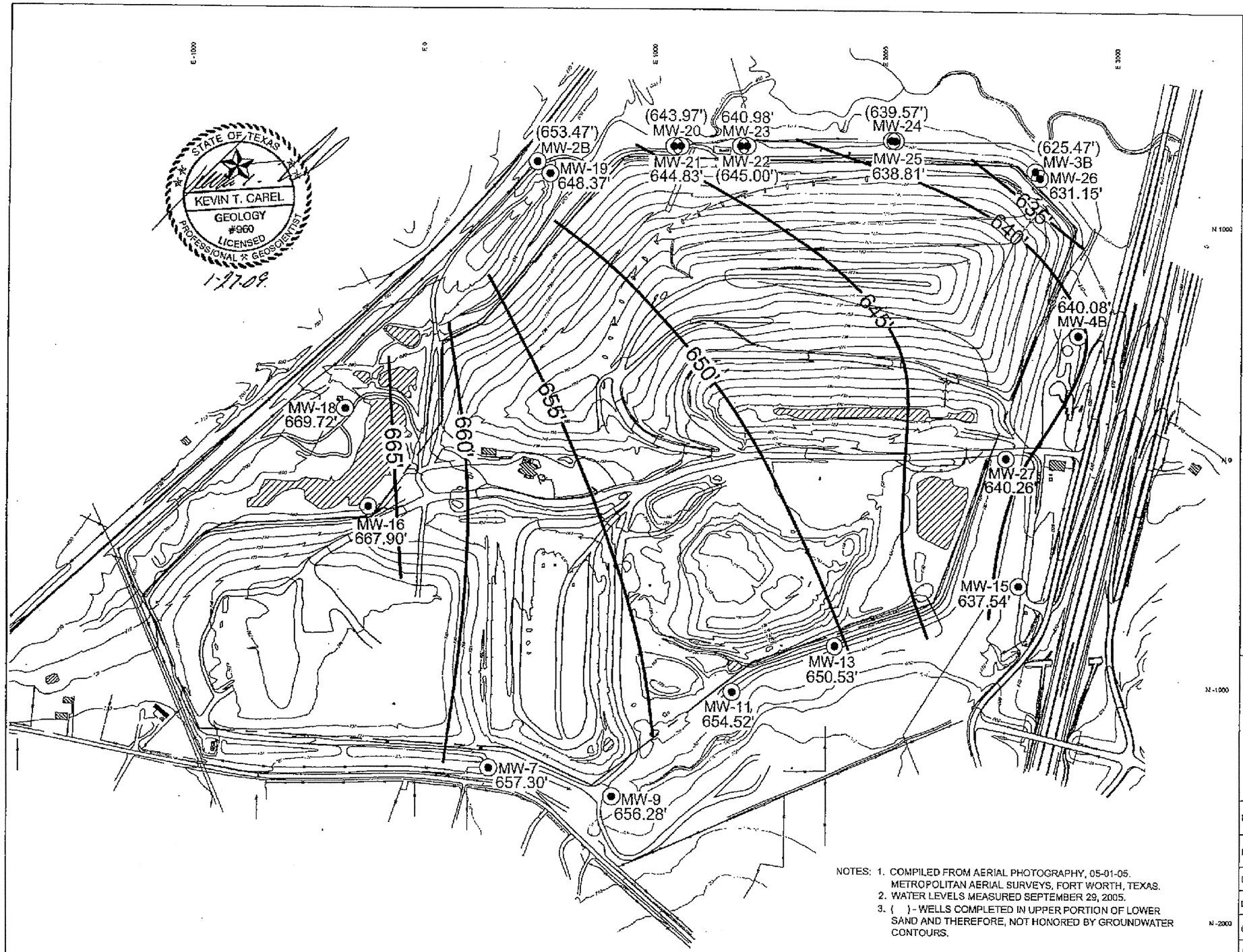
CHECKED BY: KTC	
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 05-01-05. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED SEPTEMBER 29, 2005.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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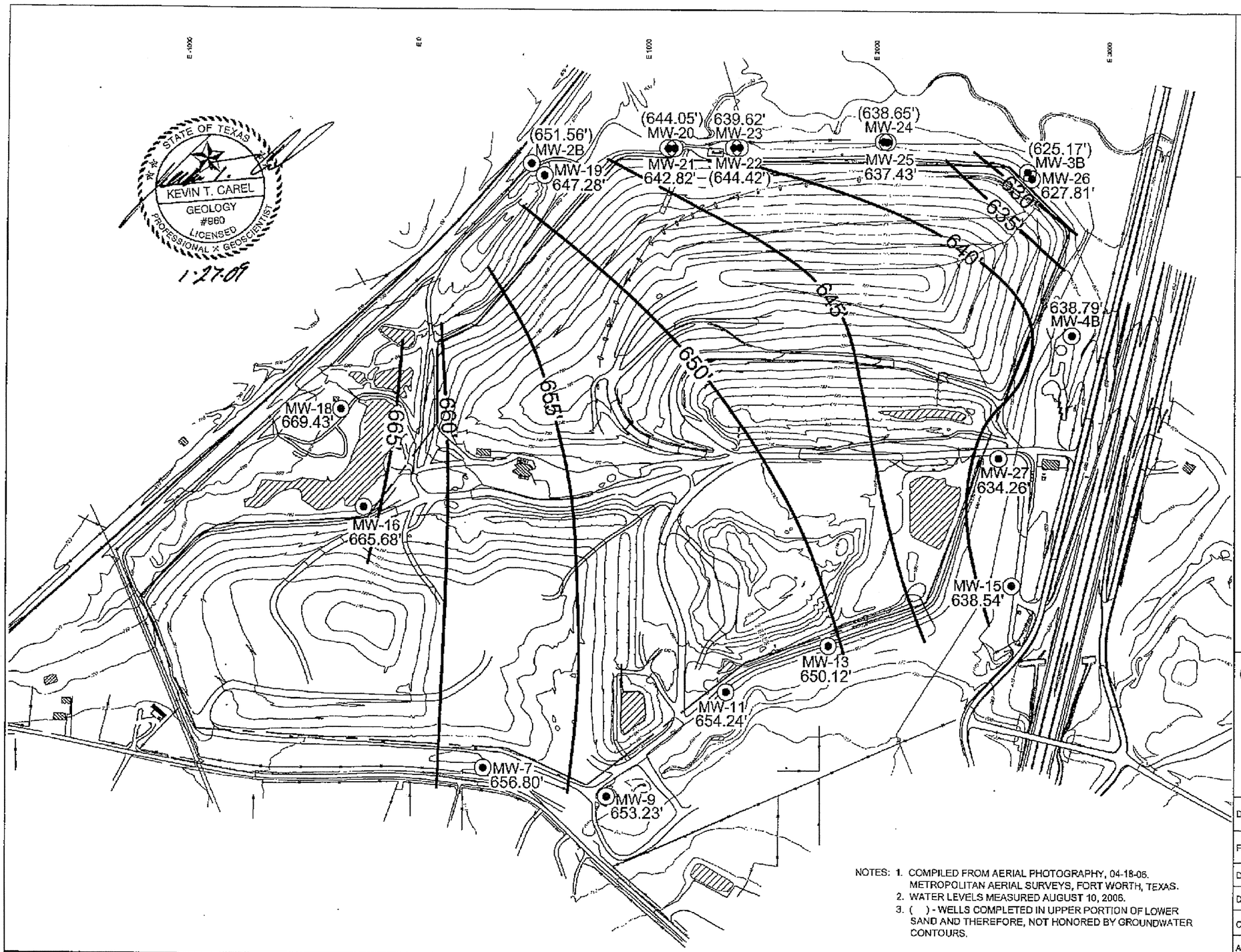
APPROVED BY: KTC	



NOTES:
1. COMPILED FROM AERIAL PHOTOGRAPHY, 04-18-06. METROPOLITAN AERIAL SURVEYS, FORT WORTH, TEXAS.
2. WATER LEVELS MEASURED AUGUST 10, 2006.
3. ( ) - WELLS COMPLETED IN UPPER PORTION OF LOWER SAND AND THEREFORE, NOT HONORED BY GROUNDWATER CONTOURS.

The CAREL CORPORATION
136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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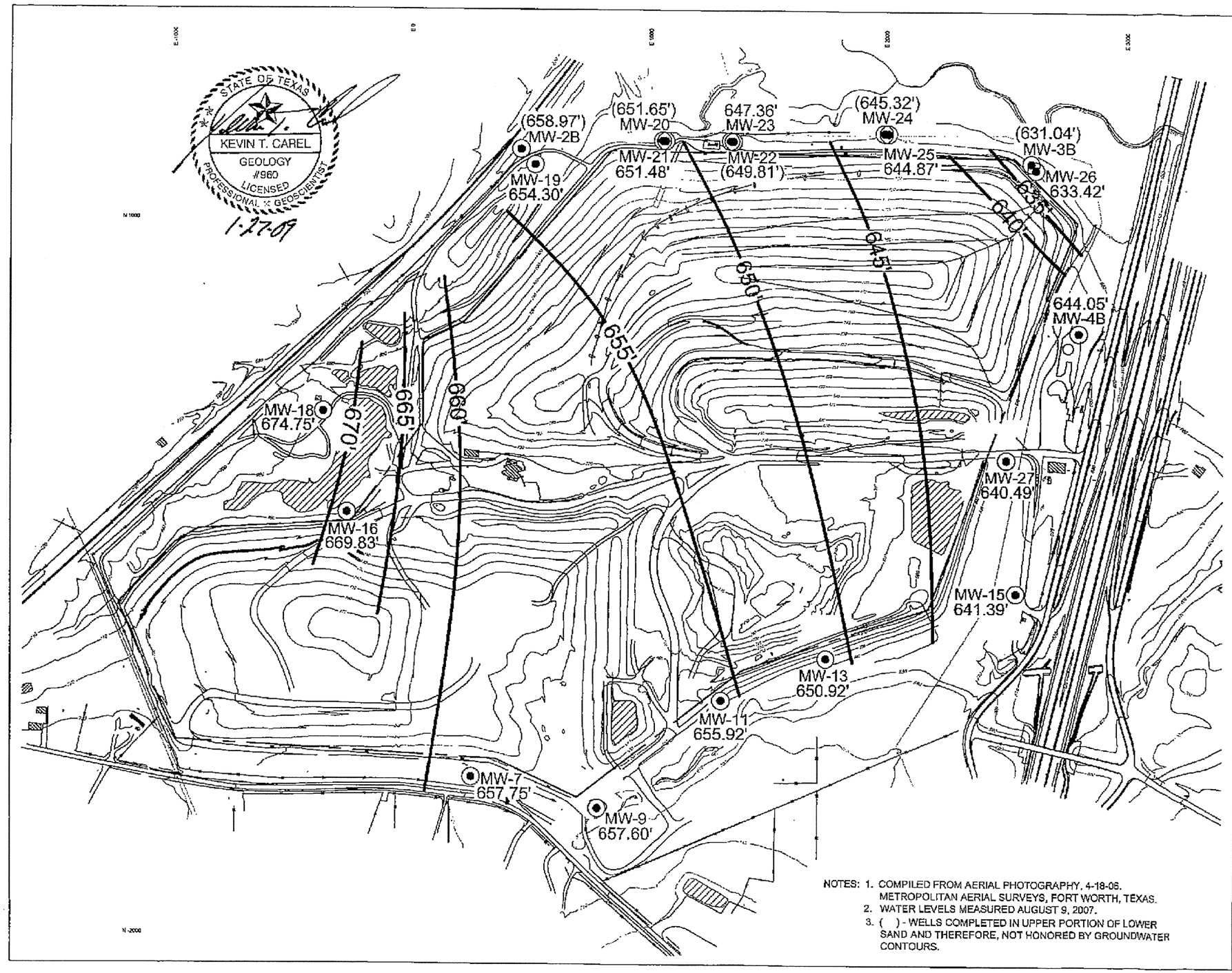
APPROVED BY: KTC	



The CAREL CORPORATION

136 Pecan Street, Keller, TX 76248

LEGEND:

- APPROXIMATE SITE BOUNDARY
- GROUNDWATER MONITOR WELL
- 360 EXISTING SURFACE CONTOUR
- GROUNDWATER CONTOUR

SCALE:

0 100 200 400
FEET

GROUNDWATER CONTOUR MAP
UPPERMOST AQUIFER

TURKEY CREEK LANDFILL
JOHNSON COUNTY, TEXAS

DATE DRAFTED: January 26, 2009	REV. NO.: 0
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DESIGNED BY: JFZ	FIGURE: E11D.2-13
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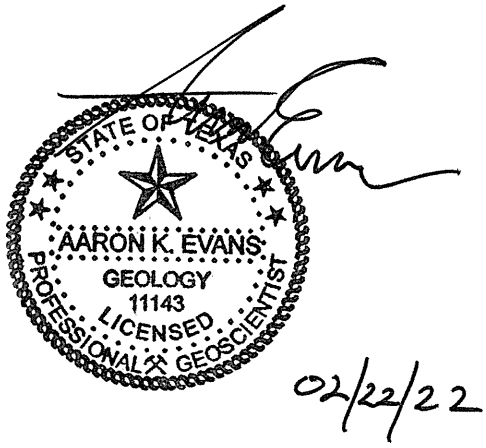
CHECKED BY: KTC	
APPROVED BY: KTC	

APPENDIX IIIH-B

GROUNDWATER MONITORING DATA



CONTENTS

Table IIIH-B-1 Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells IIIH-B-1

Table IIIH-B-2 VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells IIIH-B-19

Table IIIH-B-3 Total Metals Analytical Data from Former Subtitle D Groundwater Monitoring Wells IIIH-B-34

Table IIIH-B-4 VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells IIIH-B-37

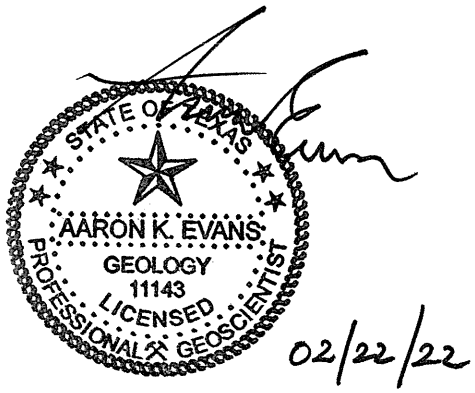


Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-3B	01/30/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/24/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/08/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	10/25/07	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/26/09	no data	<5	16	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/26/10	no data	no data	16	no data	<2	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/11/10	no data	no data	38	<4	no data	<2	14	<1	no data	38	no data	<1	no data	<1	<1
	11/03/10	<5	<5	25	<4	<2	<2	10.7	<1	<1	34.7	<5	<1	<1	<1	<1
	02/15/11	<5	<5	21.8	<4	<2	<2	<5	<1	<1	20.3	<5	<1	<1	<1	<1
	08/11/11	<5	<5	13.2	<4	<2	<2	<5	10	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	10.1	<4	<2	<2	5.12	no data	<1	20	<5	<1	<1	<1	<1
	04/19/12	no data	no data	no data	no data	no data	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data
	08/16/12	<5	<5	21	<4	<2	<2	<5	<1	<1	21	<5	<1	<1	<1	<1
	02/12/13	<5	<5	15	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	14	<4	<2	<2	5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	12	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	16	<4	<2	<2	5.2	<1	<1	26	<5	<1	<1	<1	<1
	03/25/15	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	19	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	37	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	24	<4	<2	<2	7.1	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	8.2	15	<4	<2	<2	61	<1	<1	73	<5	<1	<1	<1	<1
	12/16/20	no data	<5	no data	no data	no data	no data	18	no data	no data	22	no data	no data	no data	no data	no data
	03/15/21	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-7	01/29/07	<5	no data	34	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/21/07	<5	no data	32	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/06/07	<5	no data	32	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/26/09	no data	<5	30	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	32	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/24/10	no data	no data	33	no data	<2	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	no data	no data	32	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/01/10	<5	<5	30.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	31.6	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/09/11	<5	<5	30.2	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/11/13	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/14	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/19	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-9	01/29/07	<5	no data	58	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/22/07	<5	no data	57	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/07/07	<5	no data	69	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	06/23/08	no data	no data	55	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	08/25/09	no data	<5	44	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	70	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/24/10	no data	no data	63	no data	<2	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	no data	no data	58	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/02/10	<5	<5	50	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	52.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/09/11	<5	<5	34.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	44	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	47	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/11/13	<5	<5	120	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/01/13	no data	no data	29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	08/07/13	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/14	<5	<5	45	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	41	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	<5	51	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	37	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	49	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	36	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	51	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	68	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	47	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	53	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/19	<5	<5	50	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	40	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	53	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	56	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	50	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-13	01/30/07	<5	no data	24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	04/19/07	<5	no data	24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/22/07	<5	no data	24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/09/07	<5	no data	22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/26/09	no data	<5	22	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	23	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/24/10	no data	no data	23	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/10/10	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/04/10	<5	<5	20.1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	23.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	21.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	19.2	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/11/13	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/07/13	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/13/14	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-15	01/30/07	<5	no data	22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/23/07	<5	no data	23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/09/07	<5	no data	22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/26/09	no data	<5	21	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	24	no data	<2	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/10/10	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/04/10	<5	<5	21.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	25.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	23.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/31/12	<5	<5	20.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/12/13	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/07/13	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/13/14	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/20/14	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/26/15	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/18	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/19	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/17/21	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-17	01/30/07	<5	no data	27	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/21/07	<5	no data	21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/07/07	<5	no data	21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/27/09	no data	<5	31	no data	no data	no data	21	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	25	no data	no data	no data	15	no data	no data	no data	no data	<1	<1	<1	no data
	05/24/10	no data	no data	23	no data	<2	no data	14	no data	no data	no data	<1	<1	no data	<1	no data
	08/09/10	<5	<5	23	<4	<2	<2	15	<1	<1	27	<5	<1	<1	<1	<1
	11/01/10	<5	<5	20.4	<4	<2	<2	13.5	<1	<1	28.2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	20.1	<4	<2	<2	13.8	<1	<1	27.8	<5	<1	<1	<1	<1
	08/09/11	<5	<5	17.8	<4	<2	<2	20.3	<1	<1	28.9	<5	<1	<1	<1	<1
	01/30/12	<5	<5	18.2	<4	<2	<2	24.5	<1	<1	30.1	<5	<1	<1	<1	<1
	08/14/12	<5	<5	27	<4	<2	<2	18	<1	<1	25	<5	<1	<1	<1	<1
	02/11/13	<5	<5	19	<4	<2	<2	24	<1	<1	31	<5	<1	<1	<1	<1
	08/07/13	<5	<5	18	<4	<2	<2	21	<1	<1	27	<5	<1	<1	<1	<1
	03/13/14	<5	<5	19	<4	<2	<2	18	<1	<1	23	<5	<1	<1	<1	<1
	08/18/14	<5	<5	19	<4	<2	<2	20	<1	<1	28	<5	<1	<1	<1	<1
	12/08/14	no data	no data	no data	no data	no data	no data	32	no data	no data	no data	no data	no data	no data	no data	no data
	03/24/15	<5	<5	18	<4	<2	<2	28	<1	<1	35	<5	<1	<1	<1	<1
	09/14/15	<5	<5	18	<4	<2	<2	32	<1	<1	34	<5	<1	<1	<1	<1
	03/22/16	<5	<5	19	<4	<2	<2	38	<1	<1	31	<5	<1	<1	<1	<1
	09/13/16	<5	<5	20	<4	<2	<2	26	<1	<1	28	<5	<1	<1	<1	<1
	03/27/17	<5	<5	15	<4	<2	<2	28	<1	<1	29	<5	<1	<1	<1	<1
	09/25/17	<5	<5	16	<4	<2	<2	30	<1	<1	34	<5	<1	<1	<1	<1
	03/22/18	<5	<5	14	<4	<2	<2	30	<1	<1	32	<5	<1	<1	<1	<1
	09/11/18	<5	<5	16	<4	<2	<2	30	<1	<1	27	<5	<1	<1	<1	<1
	03/12/19	<5	<5	13	<4	<2	<2	30	<1	<1	24	<5	<1	<1	<1	<1
	09/11/19	<5	<5	13	<4	<2	<2	32	<1	<1	25	<5	<1	<1	<1	<1
	12/18/19	no data	no data	no data	no data	no data	no data	31	no data	no data	no data	no data	no data	no data	no data	no data
	03/23/20	<5	<5	14	<4	<2	<2	38	<1	<1	28	<5	<1	<1	<1	<1
	08/11/20	no data	no data	no data	no data	no data	no data	30	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/20	<5	<5	12	<4	<2	<2	29	<1	<1	24	<5	<1	<1	<1	<1
	03/16/21	<5	<5	11	<4	<2	<2	30	<1	<1	22	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-18	01/29/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/21/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/07/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/27/09	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/19/10	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	no data	no data	no data	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/04/10	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/18	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/19	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	220
	12/16/20	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	03/16/21	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-19	01/29/07	<5	no data	27	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/23/07	<5	no data	25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/07/07	<5	no data	28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/25/09	no data	<5	26	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/19/10	no data	<5	23	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	35	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	no data	no data	30	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/01/10	<5	<5	18.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	19.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	17.7	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/31/12	<5	<5	20.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/07/13	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/18	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/01/19	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/19	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-20	01/29/07	<5	no data	no data	15	5.8	no data	670	no data	no data	910	no data	no data	no data	no data	1300
	05/23/07	<5	no data	no data	9.6	3.2	no data	420	no data	no data	540	no data	no data	no data	no data	870
	08/08/07	<5	no data	no data	13	5	no data	620	no data	no data	790	no data	no data	no data	no data	1200
	08/25/09	no data	<5	<1	9.8	3.6	no data	450	no data	no data	690	no data	<1	<1	<1	960
	02/09/10	no data	<5	<1	12	5.5	no data	710	no data	no data	870	no data	<1	<1	no data	1300
	05/25/10	no data	no data	<1	12	no data	no data	630	no data	no data	740	<5	<1	no data	no data	1100
	08/09/10	no data	no data	<1	9.9	no data	<2	520	<1	no data	680	no data	no data	no data	no data	960
	11/03/10	<5	<5	11.3	8.38	2.52	<2	619	<1	<1	827	<5	<1	<1	<1	1110
	02/15/11	<5	<5	10.9	6.32	<2	<2	469	<1	<1	603	<5	<1	<1	<1	845
	08/11/11	<5	<5	<1	7.15	<2	<2	351	<1	<1	493	<5	<1	<1	<1	572
	02/01/12	<5	<5	<1	9.02	2.13	<2	442	22.2	<1	609	<5	<1	<1	<1	759
	04/19/12	no data	no data	no data	no data	no data	no data	no data	18	no data	no data	no data	no data	no data	no data	no data
	08/15/12	<5	<5	11	8.5	2	<2	480	<1	<1	650	<5	<1	<1	<1	910
	02/13/13	<5	<5	<1	12	2.8	<2	450	<1	<1	660	<5	<1	<1	<1	820
	08/06/13	<5	<5	<1	11	2.7	<2	470	<1	<1	660	<5	<1	<1	<1	880
	03/11/14	<5	<5	<1	9.8	<2	<2	320	<1	<1	430	<5	<1	<1	<1	770
	08/19/14	<5	<5	<1	10	<2	<2	380	<1	<1	490	<5	<1	<1	<1	770
	03/25/15	<5	<5	<1	12	<2	<2	380	<1	<1	490	<5	<1	<1	<1	800
	09/14/15	<5	<5	<1	9	2.1	<2	470	<1	<1	660	<5	<1	<1	<1	860
	03/22/16	<5	<5	<1	17	4.8	<2	800	13	<1	890	<5	<1	<1	<1	1500
	09/12/16	<5	<5	11	12	2.7	<2	690	<1	<1	810	<5	<1	<1	<1	1200
	03/27/17	<5	<5	<1	7.5	<2	<2	310	<1	<1	390	<5	<1	<1	<1	650
	09/25/17	<5	<5	<1	5.4	<2	<2	310	<1	<1	390	<5	<1	<1	<1	590
	03/23/18	<5	<5	<1	7.4	<2	<2	270	<1	<1	330	<5	<1	<1	<1	580
	09/12/18	<5	<5	<1	7.1	<2	<2	300	<1	<1	390	<5	<1	<1	<1	530
	04/01/19	<5	<5	<1	19	4.3	<2	910	13	<1	970	<5	<1	<1	<1	1600
	09/11/19	<5	<5	<1	9.1	<2	<2	610	<1	<1	710	<5	<1	<1	<1	1100
	03/23/20	<5	<5	<1	10	<2	<2	450	<1	<1	520	<5	<1	<1	<1	850
	09/15/20	<5	<5	<1	7	<2	<2	300	<1	<1	340	<5	<1	<1	<1	540
	03/15/21	<5	<5	<1	<4	<2	<2	240	<1	<1	280	<5	<1	<1	<1	480

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-21	01/29/07	<5	no data	42	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/23/07	<5	no data	39	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/08/07	<5	no data	35	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/25/09	no data	<5	35	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	33	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	35	no data	<2	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	<5	<5	34	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/03/10	<5	<5	31.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	35.2	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	32.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	37.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	46	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	39	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	<5	38	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	37	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	37	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	34	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	32	<4	<2	<2	5.5	<1	<1	<2	<5	<1	<1	<1	<1
	06/14/17	no data	no data	no data	no data	no data	no data	<5	no data	no data	no data	no data	no data	no data	no data	no data
	09/25/17	<5	<5	34	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	30	<4	<2	<2	20	<1	<1	22	<5	<1	<1	<1	<1
	12/19/18	no data	no data	no data	no data	no data	no data	7.3	no data	no data	<2	no data	no data	no data	no data	no data
	04/01/19	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	30	<4	<2	<2	8	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/20	no data	no data	no data	no data	no data	no data	<5	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/20	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	36	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-26	01/30/07	<5	no data	28	7.3	no data	no data	190	no data	no data	480	no data	no data	no data	no data	460
	05/24/07	<5	no data	30	9.7	no data	no data	150	no data	no data	390	no data	no data	no data	no data	400
	08/08/07	<5	no data	no data	12	no data	no data	160	no data	no data	400	no data	no data	no data	no data	420
	08/26/09	no data	<5	<1	2.3	no data	no data	25	no data	no data	67	no data	<1	<1	<1	no data
	02/09/10	no data	<5	<1	no data	no data	no data	13	no data	no data	43	no data	<1	<1	<1	no data
	05/26/10	no data	no data	10	no data	no data	no data	27	no data	no data	50	no data	<1	no data	<1	no data
	08/11/10	no data	no data	<1	<4	no data	<2	<5	<1	no data	38	no data	<1	no data	<1	<1
	11/01/10	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/16/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/12/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	10	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	22	<4	<2	<2	20	<1	<1	21	<5	<1	<1	<1	<1
	03/22/18	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/01/19	<5	<5	12	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	15	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-27	01/30/07	<5	no data	34	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/23/07	<5	no data	31	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/09/07	<5	no data	29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/26/09	no data	<5	28	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	29	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/26/10	no data	no data	31	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/10/10	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/04/10	<5	<5	27.1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	29.7	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	28.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/31/12	<5	<5	28.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/12/13	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/13/14	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/20/14	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/26/15	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/19	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/20	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/17/21	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-28	02/19/10	no data	<5	34	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	30	no data	no data	no data	no data	no data	no data	no data	<5	<1	no data	<1	no data
	08/12/10	no data	no data	31	<4	no data	<2	7.4	<1	no data	<2	no data	<1	no data	<1	<1
	11/03/10	<5	<5	25.2	<4	<2	<2	7.08	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	24.6	<4	<2	<2	9.6	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	28.2	<4	<2	<2	7.81	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	22.8	<4	<2	<2	6.79	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	20.7	<4	<2	<2	5.76	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	17	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	17	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	17	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	14	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	15	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	<5	17	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	19	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/01/19	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	11	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	13	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	16	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-29	02/22/10	no data	<5	19	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/26/10	no data	no data	21	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/11/10	no data	no data	20	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/04/10	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	19.2	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	19.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	no data	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	19.8	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	19	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/15/12	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/07/13	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/11/14	<5	<5	21	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/19/14	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	no data	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	06/22/15	no data	no data	19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/15	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	18	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	07/01/19	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/11/19	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	<5	20	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-30	02/22/10	no data	<5	30	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/26/10	no data	no data	30	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/11/10	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/04/10	<5	<5	28.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/16/11	<5	<5	26.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	28.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	29.6	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	28.8	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	23.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/16/12	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/12/13	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/14	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/20/14	<5	<5	40	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	12/08/14	no data	no data	37	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/25/15	<5	<5	no data	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/18	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/01/19	<5	<5	34	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	31	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	34	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	<5	37	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-31	02/22/10	no data	<5	35	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/26/10	no data	no data	47	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	no data	no data
	08/11/10	no data	no data	38	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/03/10	<5	<5	26.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/16/11	<5	<5	32.7	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	31.8	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/11	<5	<5	26.7	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	25.2	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/01/12	<5	<5	25.3	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/16/12	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/12/13	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/14	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/25/15	<5	<5	50	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/18	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/18	<5	<5	30	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/20	<5	<5	41	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/20	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/15/21	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-32	05/24/10	no data	no data	25	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/10/10	<5	<5	22	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/02/10	<5	<5	19.1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	20.4	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	21.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	20.6	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	27.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/31/12	<5	<5	21.6	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	23	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/11/13	<5	<5	35	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	6.2	51	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	10/03/13	no data	<5	41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/12/14	<5	18	75	<4	<2	<2	5.8	<1	<1	<2	<5	<1	<1	<1	<1
	06/19/14	no data	6.1	no data	no data	no data	no data	5.9	no data	no data	no data	no data	no data	no data	no data	no data
	08/18/14	<5	<5	34	<4	<2	<2	5.4	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	<5	32	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/14/15	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/16	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/28/17	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	25	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	26	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/13/18	<5	<5	29	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	04/02/19	<5	<5	33	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	27	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	24	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	28	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-1

Total Metals Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-33	05/24/10	no data	no data	100	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/10/10	no data	no data	93	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/02/10	<5	<5	81.8	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	91.8	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	05/06/11	<5	<5	93.9	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	82.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/14/11	<5	<5	84.7	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	78.5	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	82	<4	no data	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/08/12	no data	no data	no data	no data	<2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	02/11/13	<5	<5	75	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/05/13	<5	<5	80	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/13/14	<5	<5	77	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	85	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	<5	72	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/15	<5	<5	69	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/21/16	<5	<5	76	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	<5	70	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/27/17	<5	<5	66	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	<5	89	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/18	<5	<5	63	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	100	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/19	<5	<5	73	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	14	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/20	<5	<5	64	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	62	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/16/21	<5	<5	63	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-2

VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1-2-Dibromo-3-chloropropane
MW-3B	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/14/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	05/17/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	11/13/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	03/07/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	06/17/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	09/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	03/05/98	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	09/23/98	<1	<1	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	03/05/99	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	09/09/99	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	03/14/00	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/16/00	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	04/03/01	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/08/01	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/21/02	<35	<35	<3.3	<5	<5	<5	<1	<5	<1	<1	<1	<1	<1
	08/09/02	<35	<35	<3.3	<5	<5	<5	<1	<5	<1	<1	<1	<1	<1
	01/29/03	<35	<35	<3.3	<5	<5	<5	<1	<5	<1	<1	<1	<1	<1
	08/06/03	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/12/04	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/11/04	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/22/05	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	09/28/05	11	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	01/06/06	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/01/06	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/09/06	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	01/30/07	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/08/07	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/05/08	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/07/08	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/05/09	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	08/26/09	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	02/09/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	08/11/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	02/15/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	08/11/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	02/01/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	08/16/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	02/12/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	08/05/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	03/11/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	08/19/14	45	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	12/08/14	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/25/15	22	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	06/22/15	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	03/21/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	09/13/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	03/28/17	14	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	06/14/17	12	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/26/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5
	03/22/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	09/12/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	04/02/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	03/23/20	40	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	08/11/20	<2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5
	03/15/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5

Well No.	Event Date	1-2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexa-none	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane
MW-3B	11/07/95	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/14/96	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	05/17/96	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<1	<5
	08/21/96	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<1	<5
	11/13/96	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<1	<5
	03/07/97	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	06/17/97	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	09/16/97	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	03/05/98	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	09/23/98	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<1	<5
	03/05/99	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	09/09/99	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	03/14/00	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/16/00	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	04/03/01	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/08/01	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/21/02	<1	<1	<1	<1	<5	<5	<2	<1	<5	<5	<5	<1	<1	<35	<1	no data	<1	<5	<35	<35
	08/09/02	<1	<1	<1	<1	<5	<5	<2	<1	<5	<5	<5	<1	<1	<35	<1	<5	<1	<5	<35	<35
	01/29/03	<1	<1	<1	<1	<5	<5	<2	<1	<5	<5	<5	<1	<1	<35	<1	<5	<1	<5	<35	<35
	08/06/03	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/12/04	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/11/04	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/22/05	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	09/28/05	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	01/06/06	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/01/06	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/09/06	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	01/30/07	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	no data	<5	<7.5	no data	<5
	08/08/07	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/05/08	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/07/08	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<5	<5
	02/05/09	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	08/26/09	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5
	02/09/10	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1
	08/11/10	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	02/15/11	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	08/11/11	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	02/01/12	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5
	08/16/12	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5
	02/12/13	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5
	08/05/13	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	03/11/14	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	08/19/14	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	12/08/14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/25/15	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	06/22/15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/15	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	03/21/16	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	09/13/16	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	03/28/17	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	06/14/17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/26/17	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1
	03/22/18	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5
	09/12/18	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5
	04/02/19	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	09/11/19	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	03/23/20	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	08/11/20	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/20	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5
	03/15/21	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5

Well No.	Event Date	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-3B	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/14/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	05/17/96	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	08/21/96	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	11/13/96	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	03/07/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	06/17/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	09/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	03/05/98	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	09/23/98	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	03/05/99	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	09/09/99	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	03/14/00	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	08/16/00	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	04/03/01	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	08/08/01	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/21/02	<35	<1	<1	<1	<1	<5	<5	<5	<5	<1	<1	<1	<2	<5
	08/09/02	<35	<1	<1	<1	<1	<5	<5	<5	<5	<1	<1	<1	<2	<5
	01/29/03	<35	<1	<1	<1	<1	<5	<5	<5	<5	<1	<1	<1	<2	<5
	08/06/03	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	02/12/04	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	08/11/04	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	02/22/05	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	09/28/05	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	01/06/06	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/01/06	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	08/09/06	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	01/30/07	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	08/08/07	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	02/05/08	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	08/07/08	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	02/05/09	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	08/26/09	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<2	<5
	02/09/10	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
	08/11/10	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/15/11	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/11	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/01/12	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/16/12	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/12/13	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/05/13	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	03/11/14	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/19/14	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	12/08/14	no data	no data	no data	no data	<5	no data	no data	no data	<5	no data	no data	no data	no data	no data
	03/25/15	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	06/22/15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/15	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/21/16	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/28/17	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	06/14/17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/26/17	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/18	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/12/18	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	04/02/19	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/19	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/23/20	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/20	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/20	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/15/21	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1

Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-7	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/13/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	05/18/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	no data	<5	<5	<5	<5	<5	<5
	08/22/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	03/06/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Methyl Iodide	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichlorofluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorob-enzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexa-none	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-13	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/14/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	03/06/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	06/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	12/08/14	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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	09/12/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<2	<1	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<3	<5	<1	<1	<1	<2
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-15	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	08/22/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	03/06/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	03/05/98	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2

VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1-2-Dibromo-3-chloropropane	1-2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexa-none	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-17	11/06/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	02/14/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2 - Tetrachloro-ethane	1,1,2,2 - Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-18	11/06/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/12/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichlorofluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-19	11/06/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	08/07/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<1	<2	<1	<2	<1
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	09/14/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<1	<2	<1	<2	<1
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-20	11/06/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	06/17/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	09/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-21	11/06/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/13/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	11/14/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	06/17/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	09/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-26	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/14/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	11/13/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-27	11/07/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-28	02/19/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<5	<2	<2	<1	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
	08/12/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/15/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/01/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/15/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/13/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/05/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	03/11/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/19/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	03/25/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	09/14/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/28/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/25/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/23/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/12/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	04/01/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/23/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/15/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/15/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
MW-29	02/22/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
	08/11/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/15/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/01/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/15/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/13/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/07/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	03/11/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/19/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	03/25/15	11	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	06/22/15	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/15/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/28/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/26/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/17/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	04/02/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1[2]	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/23/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/14/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/15/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1

Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-30	02/22/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<5	<2	<2	<2	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<1	<2	<2	<3	<1	<2
	08/11/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/16/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/01/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/16/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/12/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/05/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	02/12/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/20/14	11	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	12/08/14	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<5	no data	no data	no data	<5	no data	no data	no data	no data	no data
	08/25/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	09/15/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/21/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	08/27/17	17	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	06/14/17	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/26/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	01/01/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/23/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/14/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/15/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
MW-31	02/22/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
	08/11/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/16/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/11/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/01/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/16/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/12/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/05/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<2	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	02/12/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/18/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	02/25/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	09/15/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	08/21/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	08/27/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/26/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	04/02/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/24/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/14/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/15/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<2	<5	<1	<5	<1	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1

Table IIIH-B-2
VOC Analytical Data from Existing Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-32	02/10/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<3	<5	<2	<2	<1	<1	<5	<6	<1	<5	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
	08/10/10	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	no data	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<1	<1	<1	<2	<1
	02/14/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/10/11	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	01/31/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/14/12	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	02/11/13	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/06/13	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/12/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/18/14	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<2	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/24/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	09/14/15	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<5	<1	<1	<1	<5	<2	<2	<3	<1	<2
	08/21/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/13/16	27	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	12/15/16	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	08/28/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/26/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
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	01/02/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
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MW-33	02/10/10	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<1	<3	<5	<2	<2	<1	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2	<3	<1	<2
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	09/12/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	08/27/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	08/25/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
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	09/15/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	08/16/21	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1

Table IIIH-B-3

Total Metals Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-1C	01/30/07	<5	<10	28	<2	<3	<50	<50	<50	<10	260	<20	<50	<2	<50	370
	05/23/07	<5	<10	24	2	<3	<50	<50	<50	<10	220	<20	<50	<2	<50	340
	08/09/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	150	<20	<50	<2	<50	230
MW-2B	01/29/07	<5	<10	30	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/23/07	<5	<10	20	<2	<3	<50	<50	<50	<10	<50	20	<50	<2	<50	<100
	08/07/07	<5	<10	32	<2	<3	<50	<50	<50	<10	<50	20	<50	<2	<50	<100
MW-4B	01/30/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/24/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/09/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-6	01/29/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/22/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/06/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-8	01/29/07	<5	<10	40	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/22/07	<5	<10	48	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/07/07	<5	<10	79	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-10	01/30/07	<5	<10	25	<2	<3	<50	<50	<50	<10	92	<20	<50	<2	<50	<100
	05/22/07	<5	<10	22	<2	<3	<50	<50	<50	<10	86	<20	<50	<2	<50	<100
	08/07/07	<5	<10	23	<2	<3	<50	<50	<50	<10	110	<20	<50	<2	<50	100
MW-11	01/30/07	<5	<10	74	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/22/07	<5	<10	71	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/09/07	<5	<10	68	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-12	01/29/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	90	<20	<50	<2	<50	<100
	05/22/07	<5	<10	<20	2	<3	<50	<50	100	<10	68	<20	<50	<2	<50	1100
	08/09/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	80	<20	<50	<2	<50	350
MW-14	01/29/07	<5	<10	20	<2	<2	<50	160	<50	<10	330	<20	<50	<2	<50	230
	05/23/07	<5	<10	<20	<2	<3	<50	140	<50	<10	300	<20	<50	<2	<50	200
	08/09/07	<5	<10	<20	<2	<3	<50	150	<50	<10	330	<20	<50	<2	<50	210
MW-22	01/29/07	<5	<10	<20	11	4.4	<50	270	<50	<10	430	<20	<50	<2	<50	620
	05/23/07	<5	<10	<20	7.7	3.8	<50	240	<50	<10	380	<20	<50	<2	<50	560
	08/08/07	<5	<10	<20	8.8	3.8	<50	240	<50	<10	390	<20	<50	<2	<50	560
MW-23	01/29/07	<5	<10	23	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/23/07	<5	<10	23	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/08/07	<5	<10	21	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-24	01/29/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/23/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/08/07	<5	<10	<20	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
MW-25	01/29/07	<5	<10	21	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	05/23/07	<5	<10	23	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100
	08/08/07	<5	<10	24	<2	<3	<50	<50	<50	<10	<50	<20	<50	<2	<50	<100

Table IIIH-B-3

Total Metals Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-5B	01/29/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/21/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/06/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/27/09	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/09/10	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/24/10	no data	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	08/09/10	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	11/01/10	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/14/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/09/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/30/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/14/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/11/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/14	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/18/14	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/24/15	<5	8.9	<1	<4	<2	<2	15	<1	<1	<2	<5	<1	<1	<1	<1
	06/22/15	no data	15	no data	no data	no data	no data	23	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/15	<5	12	<1	<4	<2	<2	5	<1	<1	<2	<5	<1	<1	<1	<1
	03/22/16	<5	11	<1	<4	<2	<2	6.2	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/16	<5	20	<1	<4	<2	<2	6.1	<1	<1	<2	<5	<1	<1	<1	<1
	12/15/16	no data	19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/27/17	<5	<5	<1	<4	<2	<2	5.8	<1	<1	<2	<5	<1	<1	<1	<1
	09/25/17	<5	16	<1	<4	<2	<2	6.1	<1	<1	<2	<5	<1	<1	<1	<1
	12/13/17	no data	9	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/22/18	<5	6.2	<1	<4	<2	<2	10	<1	<1	<2	<5	<1	<1	<1	<1
	09/12/18	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/12/19	<5	<5	10	<4	<2	<2	6.3	13	<1	<2	<5	<1	<1	<1	110
	07/01/19	no data	no data	no data	no data	no data	no data	no data	<1	no data	no data	no data	no data	no data	no data	<1
	09/11/19	<5	5.3	10	<4	<2	<2	5.1	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	6.6	12	<4	<2	<2	6.1	<1	<1	<2	<5	<1	<1	<1	<1
	08/11/20	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/20	<5	6.6	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1

Table IIIH-B-3

Total Metals Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Total Antimony	Total Arsenic	Total Barium	Total Beryllium	Total Cadmium	Total Chromium	Total Cobalt	Total Copper	Total Lead	Total Nickel	Total Selenium	Total Silver	Total Thallium	Total Vanadium	Total Zinc
MW-16	01/29/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	05/22/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/07/07	<5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1
	08/27/09	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	02/19/10	no data	<5	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	<1	<1	no data
	05/25/10	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	<1	no data
	08/09/10	no data	no data	<1	<4	no data	<2	<5	<1	no data	<2	no data	<1	no data	<1	<1
	11/04/10	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/15/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/10/11	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	01/31/12	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	02/13/13	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	08/06/13	<5	<5	13	<4	<2	<2	14	<1	<1	25	<5	<1	<1	<1	<1
	10/03/13	no data	no data	<1	no data	no data	no data	9	no data	no data	<2	no data	no data	no data	no data	no data
	03/11/14	<5	<5	11	<4	<2	<2	9.1	<1	<1	<2	<5	<1	<1	<1	<1
	06/19/14	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	08/19/14	<5	<5	12	<4	<2	<2	11	<1	<1	<2	<5	<1	<1	<1	<1
	12/08/14	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	03/25/15	<5	<5	15	<4	<2	<2	7.8	<1	<1	<2	<5	<1	<1	<1	<1
	06/22/15	no data	no data	22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/14/15	<5	<5	11	<4	<2	<2	8.9	<1	<1	26	<5	<1	<1	<1	<1
	03/21/16	<5	5.9	20	<4	<2	<2	<5	<1	<1	41	<5	<1	<1	<1	<1
	06/09/16	no data	5.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/12/16	<5	<5	21	<4	<2	<2	<5	<1	<1	54	<5	<1	<1	<1	<1
	03/27/17	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/26/17	<5	<5	<1	<4	<2	<2	<5	<1	<1	49	<5	<1	<1	<1	<1
	12/13/17	no data	no data	no data	no data	no data	no data	no data	no data	no data	27	no data	no data	no data	no data	no data
	03/22/18	<5	<5	<1	<4	<2	<2	<5	<1	<1	23	<5	<1	<1	<1	<1
	09/11/18	<5	<5	<1	<4	<2	<2	<5	<1	<1	27	<5	<1	<1	<1	<1
	12/19/18	no data	no data	no data	no data	no data	no data	no data	no data	no data	<2	no data	no data	no data	no data	no data
	03/12/19	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/11/19	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	03/23/20	<5	<5	<1	<4	<2	<2	<5	<1	<1	<2	<5	<1	<1	<1	<1
	09/15/20	<5	<5	<1	<4	<2	<2	<5	<1	<1	46	<5	<1	<1	<1	<1

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-1C	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/14/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/17/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/22/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	11/14/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	03/07/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/17/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/05/98	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/23/98	<100	<100	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/05/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/09/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/15/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-2B	11/07/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-5B	11/07/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	02/14/96	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
	05/16/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	08/21/96	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
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	06/16/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
	09/15/97	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
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	08/15/00	<1	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5
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	06/09/16	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
	09/12/16	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/27/17	<1	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	09/25/17	<2	<2	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	<1	<1	<1	<3	<5	<2	<2	<1	<1	<2	<6	<1	<5	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<3	<1	<2
	03/22/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/12/18	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<5	<1	<5	<1	<2	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
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	09/11/19	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	03/23/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1
	09/14/20	<2	<5	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<1	<1	<1	<1	<1	<1	<1	<2	<5	<2	<5	<1	<5	<1	<5	<5	<5	<5	<2	<2	<1	<5	<1	<1	<1	<5	<1	<1	<1	<2	<1

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-6	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/13/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/18/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/22/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<50	<5	<5
	11/14/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<50	<5	<5
	03/06/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/15/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	03/14/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	02/10/04	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/09/04	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/21/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/28/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
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	08/06/07	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
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	08/04/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/02/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/26/09	22	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/10/10	<10	<20	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2.5	<3	<1	<2
	08/09/10	<20	<50	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<100	<1	<1	<1	<1	no data	<1	<2	<5	<2	<5	<10	<5	<1	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<10	<1	<100	<2	<10

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-8	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/15/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/18/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
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	11/14/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
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Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-10	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	08/10/04	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/22/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	09/29/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	03/01/06	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/10/06	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	01/30/07	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	no data	<5	<7.5	no data	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/07/07	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/05/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
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	02/03/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/26/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
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	08/09/10	<20	<50	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<100	<1	<1	<1	<1	no data	<1	<2	<5	<2	<5	<10	<5	<1	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<10	<1	<100	<2	<10
	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorob-enzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloropr-opene	trans-1,3-Dichloropr-opene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Methyl Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachlor-oethane	1,1,2,2-Tetrachlor-oethane	Tetrachlor-oethylene	Toluene	1,1,1-Trichlor-oethane	1,1,2-Trichlor-oethane	Trichlor-oethylene	Trichlor-ofluoro-methane	1,2,3-Trichloropr-opane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-11	02/13/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/17/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/22/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	11/15/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	03/06/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/15/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/04/98	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/23/98	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	09/09/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	02/22/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<2	<5
	09/29/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<2	<5
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	08/05/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<2	<5
	02/03/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<2	<5
	08/26/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<2	<5
	02/10/10	<10	<20	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2.5	<3	<1	<2
	08/09/10	<20	<50	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<100	<1	<1	<1	<1	no data	<1	<2	<5	<2	<5	<10	<5	<1	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<10	<1	<100	<2	<10

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-12	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/14/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/17/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/22/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
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	03/06/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/15/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	02/10/10	<10	<20	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2.5	<3	<1	<2

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-14	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/14/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/17/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/22/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	11/14/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
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	06/17/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/05/98	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichlorofluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-16	11/06/95	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<5	<5	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<5	<5
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	06/19/14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	<1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylonitrile	Benzene	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Dibromochloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,4-Dichlorobenzene	trans-1,4-Dichloro-2-butene	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Ethylbenzene	2-Hexanone	Bromomethane	Chloromethane	Dibromomethane	Methylene chloride	Methyl Ethyl Ketone	Iodomethane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	Toluene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-22	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	08/21/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
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	08/08/07	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/04/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/06/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/04/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/25/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/19/10	<10	<20	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2.5	<3	<1	<2
	08/12/10	<20	<50	<1	<1	<1	<5	<5	<5	<1	<5	<1	<2	<5	<1	<2	<2	<100	<1	<1	<1	<1	no data	<1	<2	<5	<2	<5	<10	<5	<1	<5	<5	<5	<5	<2	<2	<3	no data	<1	<1	<3	no data	<10	<1	<100	<2	<10

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexanone	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-23	11/07/95	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	02/14/96	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	05/17/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	08/21/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	11/13/96	<100	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<5
	03/07/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/17/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/16/97	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/05/98	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/23/98	<100	<100	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<50	<10	<10	<5	<100	<5	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/05/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/09/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/14/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	08/15/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	08/06/03	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/10/04	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/10/04	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/21/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	09/27/05	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	03/01/06	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/09/06	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	01/29/07	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	no data	<5	<7.5	no data	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
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	02/04/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/06/08	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/04/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	08/25/09	<10	<50	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<2	<5
	02/19/10	<10	<20	<1	<1	<1	<1	<2	<1	<1	<2	<1	<1	<5	<1	<1	<1	<3	<1	<1	<1	<1	no data	<1	<1	<3	<1	<5	<2	<2	<1	<5	<6	<1	<5	<1	<1	<1	no data	<1	<1	<1	no data	<2	<2.5	<3	<1	<2

Table IIIH-B-4
VOC Analytical Data from Former Subtitle D Groundwater Monitoring Wells

Well No.	Event Date	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Carbon Disulfide	Carbon Tetrachloride	Chloro-benzene	Chloro-ethane	Chloroform	Dibromo-chloromethane	1,2-Dibromo-3-chloropropane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,4-Dichloro-benzene	trans-1,4-Dichloro-2-butene	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,2-Dichloro-propane	cis-1,3-Dichloro-propene	trans-1,3-Dichloro-propene	Ethyl-benzene	2-Hexa-none	Bromo-methane	Chloro-methane	Dibromo-methane	Methylene chloride	Methyl Ethyl Ketone	Iodo-methane	4-Methyl-2-Pentanone	Styrene	1,1,1,2-Tetrachloro-ethane	1,1,2,2-Tetrachloro-ethane	Tetrachloro-ethylene	Toluene	1,1,1-Trichloro-ethane	1,1,2-Trichloro-ethane	Trichloro-ethylene	Trichloro-fluoro-methane	1,2,3-Trichloro-propane	Vinyl Acetate	Vinyl Chloride	Total Xylenes
MW-24	04/28/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	09/09/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	11/18/99	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	03/14/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
	06/29/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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	11/20/00	<10	<50	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<5	<5	<10	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
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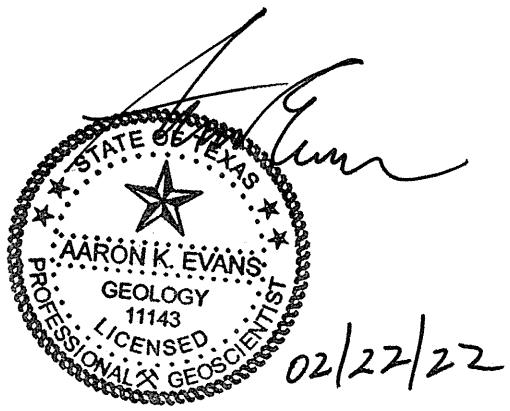
APPENDIX IIIH-C

SAMPLE FIELD DATA SHEET



SAMPLE

GROUNDWATER SAMPLING FIELD DATA SHEET

Well Number:_____
Project No.:_____

Project: _____ Date:_____ Time: _____

Personnel:_____ Weather Conditions: _____ Air Temp.: ____°F

Calibration: pH Meter Model: _____ Meter S/N: _____ Time: _____
Conductivity Meter Model: _____ Meter S/N: _____ Time: _____

WELL DATA:

Casing Diameter: ____ (in.) ☐ PVC ☐ Other: _____
DEPTH TO : Static Water: _____ ft. Well Bottom:_____ft.
DATUM: ☐ Top of Protective Casing ☐ Top of Well Casing ☐ Other: _____
CONDITION: Is Well clearly labeled? ☐ Yes ☐ No
Is Prot. Casing in Good Cond.? (not bent or corroded) ☐ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☐ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☐ Yes ☐ No

VOLUME OF WATER: $(d/24)^2$ (23.5)(TD-WL) = One Well Volume (2"=0.163; 4"=0.653)

Standing in well: _____gal. To be purged: _____gal.

PURGE DATA:

METHOD: ☐ Bladder Pump ☐ Submersible Pump ☐ Bailer
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☐ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☐ Stainless Steel ☐ PVC ☐ Other: _____

PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

TIME SERIES DATA:

Time:							
Cum. Volume (gal):	Start						
Temp. (°C):							
pH (Std. Units):							
Spec. Cond. (µmhos/cm)							
Turbidity (NTU):							
Other:							

Pumping Rate: _____ gal/min. Elapsed Time: _____ Volume Pumped: _____ gal.

SAMPLING DATA:

Sample Collection Time: _____ Date: _____
Water Level at Time of Sample Collection: _____ ft.
METHOD: ☐ Bladder Pump ☐ Submersible Pump ☐ Bailer ☐ Other: _____
MATERIALS: Pump/Bailer: ☐ Teflon® ☐ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☐ Stainless Steel ☐ PVC ☐ Other: _____
SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable
APPEARANCE: ☐ Clear ☐ Turbidity (NTU)_____ ☐ Color: _____
FIELD DETERMINATIONS: Temp. (°C): _____ pH (SU): _____ Spec. Cond. (µmhos/cm): _____
☐ Background ☐ Detection ☐ Assessment ☐ Quarterly ☐ Other

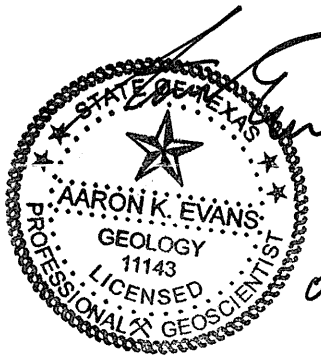
REMARKS:

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: _____

APPENDIX IIIH-D

CONTAINERIZATION AND PRESERVATION OF SAMPLES



02/22/22

RECOMMENDED CONTAINERIZATION AND PRESERVATION OF SAMPLES

Measurement[a]	Volume (mL)	Container[b]	Preservative	Holding Times	Reference
Physical Properties					
Specific Cond. (Field)	100	P,G	Cool, 4 °C	Det. on Site	1
Specific Cond. (Lab)	100	P,G	Cool, 4 °C	28 Days	1
pH (Field)	50	P,G	None	Det. on Site	1,2
pH (Lab)	50	P,G	None	24 Hrs	1,2
Temperature	1000	P,G	None	Det. On Site	1
Turbidity	100	P,G	Cool, 4 °C	Det. On Site	1

Measurement[a]	Volume (mL)	Container[b]	Preservative	Holding Times	Reference
Inorganics, Non-Metallics					
Ammonia as Nitrogen	1000	P,G	Cool, 4 °C H_2SO_4 to pH <2	28 days	2,3
Carbonate/Bicarbonate	200	P,G	Cool, 4 °C	14 days	1
Chemical Oxygen Demand (COD)	50	P,G	H_2SO_4 to pH <2	28 days	1
Chloride	200	P,G	None	28 Days	1,2
Nitrate plus Nitrite	200	P,G	Cool, 4 °C H_2SO_4 to pH <2	28 days	1,2
Sulfate	100	P,G	Cool, 4 °C	28 days	1,2
Total Alkalinity	200	P, G	Cool, 4 °C	14 days	1
Total Dissolved Solids (TDS)	500	P,G	Cool, 4 °C	7 days	2,3
Total Organic Carbon (TOC)	250	P,G	Cool, 4 °C HCL or H_2SO_4 to pH <2	28 days	2,3

RECOMMENDED CONTAINERIZATION AND PRESERVATION OF SAMPLES

Measurement[a]	Volume (mL)	Container[b]	Preservative	Holding Times	Reference
Metals (except mercury)					
Total	500	P,G	HNO_3 to pH <2	6 Mos	1,2
Dissolved	500	P,G	Filt. + HNO_3 to pH <2	6 Mos	1,2
Mercury – Total	500	P,G	HNO_3 to pH <2	28 days	1,2
Mercury – Dissolved	300	P,G	Filt. + HNO_3 to pH <2	28 days	1,2

Measurement[a]	Volume (mL)	Container[b]	Preservative	Holding Times	Reference
Organics					
Volatile Organics by GC/MS	100 (2 vials @ 40ml)	G, Teflon septum cap	Cool, 4 °C HCL to pH <2	14 days	2,3
Herbicides	1000	Glass Only	Cool, 4 °C	7 days [c] 40 days [d]	2,3
Pesticides and PCB's	1000	Glass Only	Cool, 4 °C	7 days [c] 40 days [d]	2,3
Semi-Volatiles Acid and Base/Neutral Compounds	2000	Glass Only	Cool, 4 °C	7 days [c] 40 days [d]	2,3

NOTES:

a Additional measurements not required per the GWSAP are included in the event assessment monitoring is initiated or if the need to sample for additional parameters arises due to unforeseen circumstances.

b Plastic (P) or Glass (G). For metals, polyethylene with an all polypropylene cap is preferred.

c Maximum holding time from sampling to extraction.

d Maximum holding time from extraction to analysis.

REFERENCES:

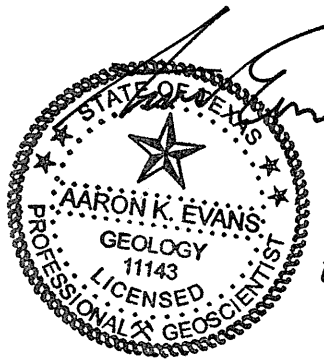
1 Methods for Chemical Analysis of Water and Wastes, March, 1983, USEPA, 600/4-79-020 and additions thereto.

2 Test Methods for Evaluating Solid Waste, Physical/Chemical Method, November, 1986, Third Edition, USEPA, SW-846 and additions thereto.

3 "Guidelines Establishing Test Procedures for the Analysis of Pollutant Under the Clean Water Act", Environmental Protection Agency, Code of Federal Regulations (CFR), Title 40, Part 136.

APPENDIX IIIH-E

SAMPLE CHAIN-OF-CUSTODY FORM



02/22/22

TO ENSURE PROPER HANDLING OF SAMPLES PLEASE COMPLETE THE SHADED AREAS OF THIS FORM

HERITAGE ENVIRONMENTAL SERVICES, LLC.

COMMERCIAL LABORATORY OPERATIONS

I -

7901 West Morris Street Indianapolis IN 46231
www.heritage-enviro.com (800)827-4374 Fax: (317) 486-5095

Bill to Customer:
Project Name:
Z Quote No:
PO No. or Project/Activity ID:

PRINT HERITAGE TSR NAME:

CUSTOMER STATUS: New / Existing

If no previous credit has been established with Heritage, **prepayment** (check,VISA,etc) is required at the time of sample submittal to the laboratory.

Sampled By:

Date Sampled	Time sampled	Comp	Grab	Sample ID and/or Location where your sample was taken	Sample Type (Matrix): DW, GW, WW, Soil, Oil, Sludge, Swipe, Other	Number Of Containers	Analyses Requested (Note special detection limits or methods)	Remarks:	Lab use only Sample No.
	AM PM						SAMPLE		
	AM PM								
	AM PM								
	AM PM								
	AM PM								
	AM PM								
	AM PM								
	AM PM								
	AM PM								
	AM PM								

Send Report To:
Co:
Add:
Attn:
Phone:
Fax:
E-mail:

Sample Turn Around Time
Standard: x Rush Date ___/___/___ (Mo Day Yr)
(Accelerated TAT subject to Additional Charge)
(Date must be Accepted and Approved by Lab)

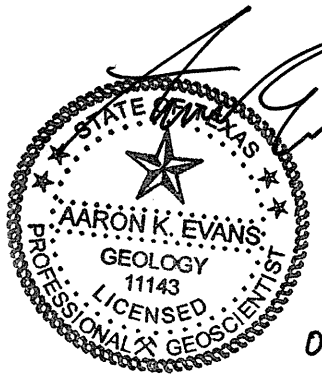
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	/	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	/	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	/	
Received for Lab by: (Signature)	Date	Temp. °C
	Time	ROI: Yes / No

Distribution: White original and Yellow copies to accompany sample to the laboratory.
Pink copy to be retained by the client.

Laboratory use only	Yes	No
Custody seals present/intact?		
Broken containers?		
COC agree with sample labels?		
Correct containers for testing?		
Headspace issues acceptable?		
Holding time(s) acceptable?		
Preservative pH's acceptable?		
Was pH left unadjusted?		

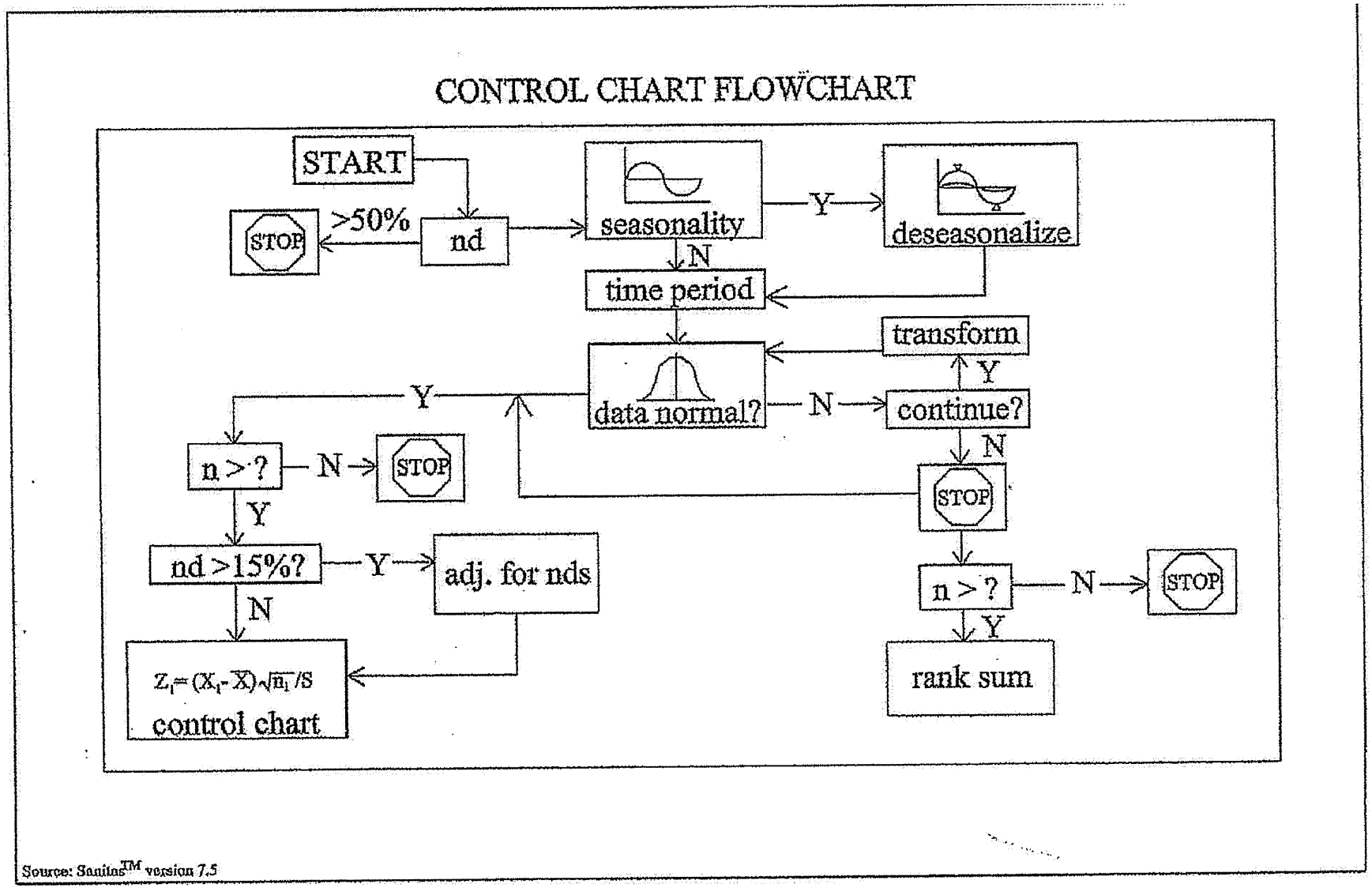
Comments:

APPENDIX IIIH-F
STATISTICAL ANALYSIS FLOW CHARTS



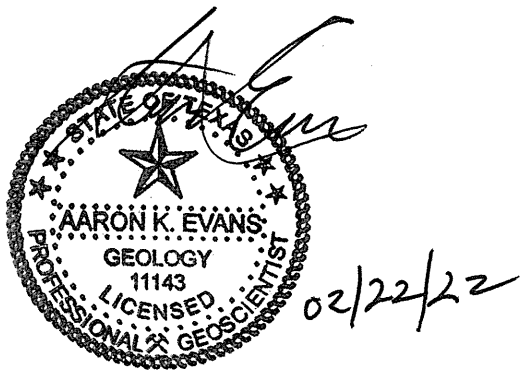
02/22/22

FIGURE 1


CONTROL CHART FLOWCHART
START
STOP
>50%
nd
seasonality
Y
deseasonalize
N
time period
transform
Y
data normal?
N
continue?
Y
n > ?
N
STOP
Y
STOP
nd >15%?
Y
adj. for nds
N
n > ?
N
STOP
Y
$Z_i = (X_i - \overline{X})\sqrt{n_i}/S$
control chart
rank sum
Source: Sanitas™ version 7.5

APPENDIX IIIH-G

SAMPLE LABORATORY QC CHECKLIST



Laboratory Data Package Cover Page

This data package consists of:

- This signature page, the laboratory review checklist, and the following reportable data:
- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  b) dilution factors,
  c) preparation methods,
  d) cleanup methods, and
  e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
  a) Calculated recovery (%R), and
  b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  a) LCS spiking amounts,
  b) Calculated %R for each analyte, and
  c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  a) Samples associated with the MS/MSD clearly identified,
  b) MS/MSD spiking amounts,
  c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
  d) Calculated %Rs and relative percent differences (RPDs), and
  e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  a) the amount of analyte measured in the duplicate,
  b) the calculated RPD, and
  c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix;
- R10 Other problems or anomalies.

The Exception Report for every "No" or "Not Reviewed (NR)" item in laboratory review checklist.

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [ ] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report (for example, the APAR) in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Name (Printed)	Signature	Official Title (printed)	Date

Laboratory Review Checklist: Reportable Data

Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]
		Chain-of-custody (C-O-C)					
R1	OI	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?					
		Were all departures from standard conditions described in an exception report?					
R2	OI	**Sample and quality control (QC) identification**					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?					
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?					
R3	OI	**Test reports**					
		Were all samples prepared and analyzed within holding times?					
		Other than those results < MQL, were all other raw values bracketed by calibration standards?					
		Were calculations checked by a peer or supervisor?					
		Were all analyte identifications checked by a peer or supervisor?					
		Were sample quantitation limits reported for all analytes not detected?					
		Were all results for soil and sediment samples reported on a dry weight basis?					
		Were % moisture (or solids) reported for all soil and sediment samples?					
		If required for the project, TICs reported?					
R4	O	**Surrogate recovery data**					
		Were surrogates added prior to extraction?					
		Were surrogate percent recoveries in all samples within the laboratory QC limits?					
R5	OI	**Test reports/summary forms for blank samples**					
		Were appropriate type(s) of blanks analyzed?					
		Were blanks analyzed at the appropriate frequency?					
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?					
		Were blank concentrations < MQL?					
R6	OI	**Laboratory control samples (LCS):**					
		Were all COCs included in the LCS?					
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?					
		Were LCSs analyzed at the required frequency?					
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?					
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?					
		Was the LCSD RPD within QC limits?					
R7	OI	**Matrix spike (MS) and matrix spike duplicate (MSD) data**					
		Were the project/method specified analytes included in the MS and MSD?					
		Were MS/MSD analyzed at the appropriate frequency?					
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?					
		Were MS/MSD RPDs within laboratory QC limits?					
R8	OI	**Analytical duplicate data**					
		Were appropriate analytical duplicates analyzed for each matrix?					
		Were analytical duplicates analyzed at the appropriate frequency?					
		Were RPDs or relative standard deviations within the laboratory QC limits?					
R9	OI	**Method quantitation limits (MQLs):**					
		Are the MQLs for each method analyte included in the laboratory data package?					
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?					
		Are unadjusted MQLs included in the laboratory data package?					
R10	OI	**Other problems/anomalies**					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?					
		Were all necessary corrective actions performed for the reported data?					
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?					

Laboratory Review Checklist: Supporting Data									
Laboratory Name:			LRC Date:						
Project Name:			Laboratory Job Number:						
Reviewer Name:			Prep Batch Number(s):						
#[1]	A[2]	Description	Yes	No	NA[3]	NR[4]	ER#[5]		
S1	OI	**Initial calibration (ICAL)**							
		Were response factors and/or relative response factors for each analyte within QC limits?							
		Were percent RSDs or correlation coefficient criteria met?							
		Was the number of standards recommended in the method used for all analytes?							
		Were all points generated between the lowest and highest standard used to calculate the curve?							
		Are ICAL data available for all instruments used?							
		Has the initial calibration curve been verified using an appropriate second source standard?							
S2	OI	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank[6] :**							
		Was the CCV analyzed at the method-required frequency?							
		Were percent differences for each analyte within the method-required QC limits?							
		Was the ICAL curve verified for each analyte?							
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?							
S3	O	**Mass spectral tuning:**							
		Was the appropriate compound for the method used for tuning?							
		Were ion abundance data within the method-required QC limits?							
S4	O	**Internal standards (IS):**							
		Were IS area counts and retention times within the method-required QC limits?							
	OI	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**							
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?							
		Were data associated with manual integrations flagged on the raw data?							
S6	O	**Dual column confirmation**							
		Did dual column confirmation results meet the method-required QC?							
S7	O	**Tentatively identified compounds (TICs):**							
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?							
S8	I	**Interference Check Sample (ICS) results:**							
		Were percent recoveries within method QC limits?							
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**							
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?							
S10	OI	**Method detection limit (MDL) studies**							
		Was a MDL study performed for each reported analyte?							
		Is the MDL either adjusted or supported by the analysis of DCSs?							
S11	OI	**Proficiency test reports:**							
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?							
S12	OI	**Standards documentation**							
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?							
S13	OI	**Compound/analyte identification procedures**							
		Are the procedures for compound/analyte identification documented?							
S14	OI	**Demonstration of analyst competency (DOC)**							
		Was DOC conducted consistent with NELAC Chapter 5C?							
		Is documentation of the analyst's competency up-to-date and on file?							
S15	OI	**Verification/validation documentation for methods** (NELAC Chap 5n 5)							
		Are all the methods used to generate the data documented, verified, and validated, where applicable?							
S16	OI	**Laboratory standard operating procedures (SOPs):**							
		Are laboratory SOPs current and on file for each method performed?							

Laboratory Review Checklist: Exception Reports	
Laboratory Name:	LRC Date:
Project Name:	Laboratory Job Number:
Reviewer Name:	Prep Batch Number(s):

ER #[5]	DESCRIPTION

1. Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
2. O= organic analyses; I = inorganic analyses (and general chemistry, when applicable);
3. NA = Not applicable;
4. NR = Not reviewed;
5. ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).

6. CCB = Continuing Calibration Blank