

**PART III
ATTACHMENT III-E
APPENDIX II-E.3**

GEOTECHNICAL DATA REPORT

For

**PESCADITO ENVIRONMENTAL RESOURCE CENTER
TYPE I MUNICIPAL SOLID WASTE MANAGEMENT FACILITY
LAREDO, WEBB COUNTY, TEXAS
MSW PERMIT NO. 2374**

Prepared for

CB&I ENVIRONMENTAL AND INFRASTRUCTURE, INC.
12005 Ford Road, Suite 600
Dallas, Texas 75234

On behalf of

RANCHO VIEJO WASTE MANAGEMENT, LLC
1116 Calle del Norte
Laredo, Texas 78041

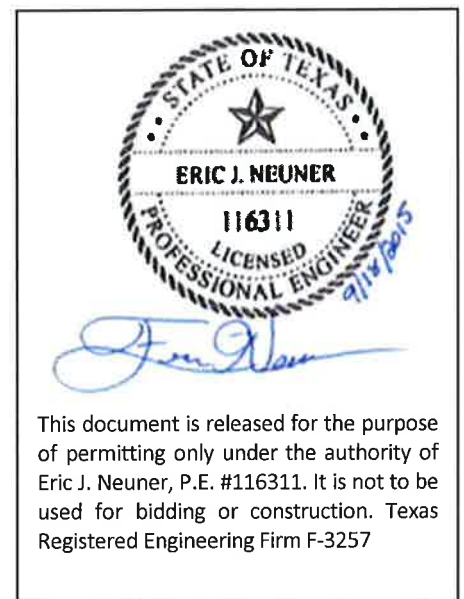
Prepared by



RABA KISTNER CONSULTANTS, INC.
12821 West Golden Lane
San Antonio, Texas 78249

PROJECT NO. ASF13-140-00

Initial Submittal February 25, 2015
Revised September 18, 2015



This document is released for the purpose of permitting only under the authority of Eric J. Neuner, P.E. #116311. It is not to be used for bidding or construction. Texas Registered Engineering Firm F-3257

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 FIELD EXPLORATION PROGRAM 1

 2.1 STANDARD PENETRATION TEST (SPT)..... 1

 2.2 POCKET PENETROMETER 2

3.0 LABORATORY TESTING..... 2

 3.1 CLASSIFICATION TESTS..... 2

 3.2 MOISTURE CONTENT TESTS 2

 3.3 PERMEABILITY TESTS 3

4.0 STRATIGRAPHY AND SOIL PROPERTIES 3

 4.1 GENERALIZED STRATIGRAPHY 3

 4.2 SOIL PROPERTIES 4

5.0 CONCLUSIONS..... 4

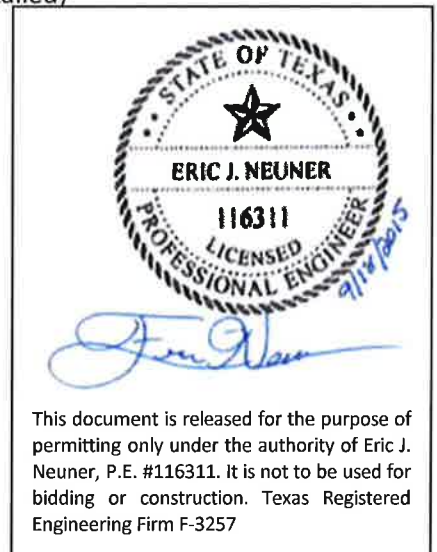
6.0 REFERENCES..... 5

LIST OF FIGURES

- Figure 1 Site Location Map
- Figure 2 Boring/Test Pit Location Map
- Figure 3 Fence Diagram Index Map

LIST OF APPENDICES

- APPENDIX A Results of Soil Sample Analyses**
- APPENDIX B Hydraulic Conductivity Test Results**
 - Figures B-1 Summary of Results
 - Figures B-2 through B-19 Hydraulic Conductivity Test Results (Detailed)
- APPENDIX C Fence Diagnostics and Measured Soil Properties**
 - Figures C-1 through C-10 Generalized Subsurface Fence Diagrams
 - Figures C-11 through C-14 Measured Soil Properties (by Stratum)



This document is released for the purpose of permitting only under the authority of Eric J. Neuner, P.E. #116311. It is not to be used for bidding or construction. Texas Registered Engineering Firm F-3257

3.3 PERMEABILITY TESTS

Permeability (hydraulic conductivity) tests were conducted in accordance with ASTM Standard Test Method D5084, Method C or falling head procedures using de-aired tap water. Permeability tests were assigned to intact undisturbed samples obtained at test pits TP-1 and TP-2. Permeability tests were conducted on samples collected from each stratum (I through IV) identified in the SIR. Samples from Strata I through IV were tested on their horizontal axis as they represent the sidewall of the proposed landfill excavation. Additionally, a sample of Stratum IV was tested along the vertical axis to represent the bottom of the proposed landfill excavation. A summary of the permeability test results are presented in tabular form on **Figure B-1** in **Appendix B** of this report. In addition, a detailed summary and graphical presentation of each hydraulic conductivity test is provided as **Figures B-2 through B-19** in **Appendix B** of this report. Note that the majority of permeability tests were performed for horizontal flow paths; the sample trimmed for a vertical flow path is indicated with “-V” as the sample number suffix on **Figures B-16 and B-17**.

4.0 STRATIGRAPHY AND SOIL PROPERTIES

The following sections address the generalized stratigraphy observed in the borings and test pit excavations performed for this study, potential uses of materials that may be excavated during construction, and typical properties of those materials. The majority of laboratory test results are presented in graphical and numerical form on the borings logs presented in **Appendix C** of the SIR.

4.1 GENERALIZED STRATIGRAPHY

The subsurface conditions encountered at the boring locations are shown on the boring logs presented in **Appendix B** of the SIR. The boring logs should be consulted for boring specific (detailed) stratigraphic information. These boring logs represent our interpretation of the subsurface conditions based on the field logs, visual examination of field samples by our personnel, and laboratory test results of selected field samples. Each stratum has been designated by grouping soils that possess similar physical and engineering characteristics. The lines designating the interfaces between strata on the boring logs represent approximate boundaries. Transitions between strata may be gradual.

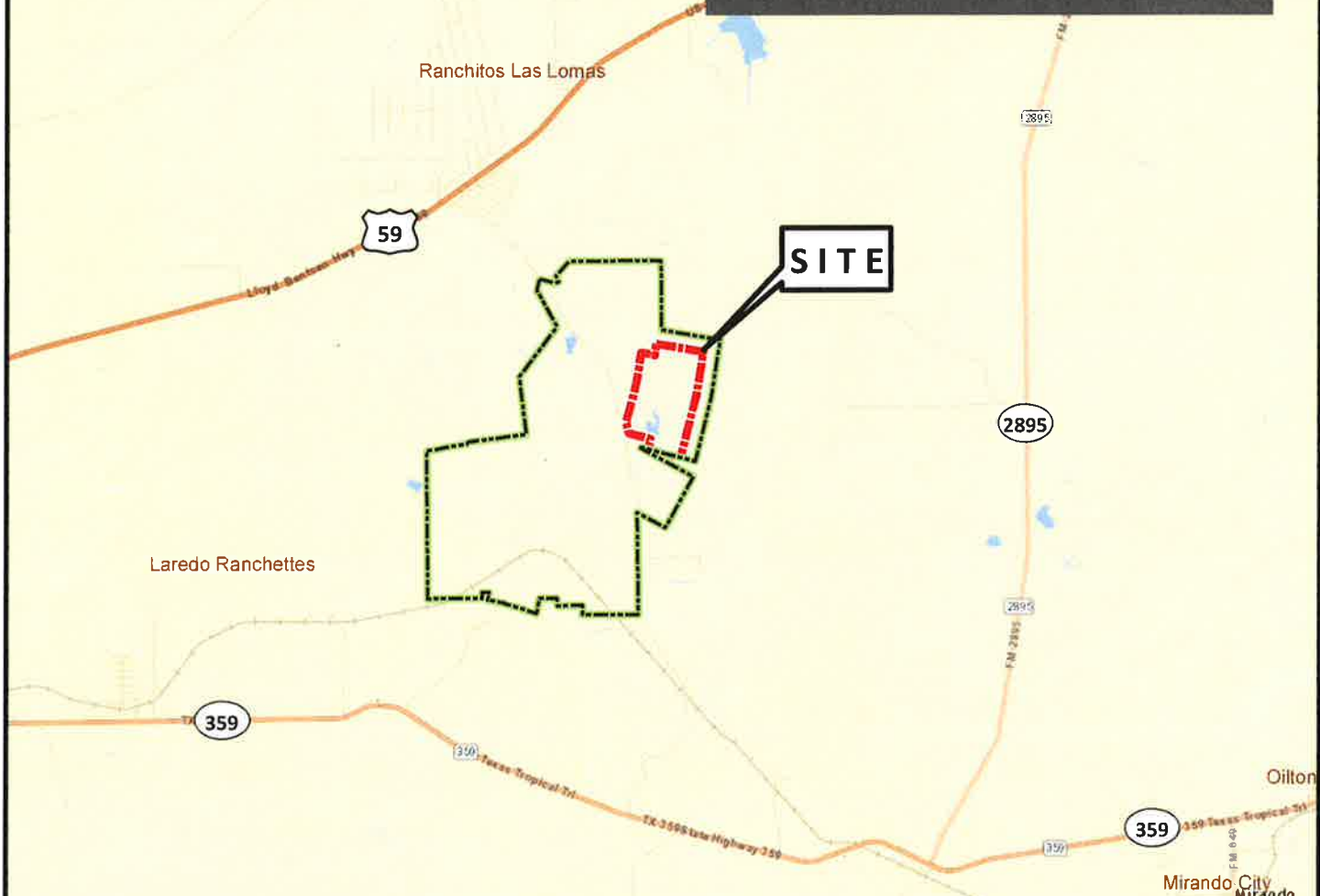
Generalized soil profiles corresponding to geologic (stratigraphic) fence diagrams included as **Figures 4 through 13** of the SIR present the soil type, layer thickness, and depth to water are also presented on **Figures C-1 through C-10** in **Appendix C** of this report. An index map is provided as **Figure 3 – Fence Diagram Index Map**. These profiles depict that the majority of soils observed in the borings were cohesive in nature and the granular inclusions were sporadic and discontinuous across the site.

As presented on the referenced figures, the stratigraphic units have been designated at the site based upon review and interpretation of boring logs and geologic sections, in addition to consideration of down hole geophysical logging data, and test pit information and photographs. In general, the soils observed within the borings and test pits performed for this study are predominately cohesive in nature. Fat clays (CH) and lean clays (CL) are predominant and were observed in about 95.5% of the samples obtained during drilling operations. Test pit observations were similar. The remaining 4.5% of samples included about 2.5% cemented soils and about 2% “granular” soils. The cemented soils included thin layers of siltstones, claystones, and clay shales. Thick layers of sandstones were observed in the relatively deep

FIGURES



0 0.75 1.5 3
Miles
APPROXIMATE SCALE



*Added permit boundary note

LEGEND

- Property Boundary
- Proposed Permit Boundary *

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

RABA KISTNER ENVIRONMENTAL
Raba Kistner Environmental, Inc.
12821 West Golden Lane
San Antonio, Texas 78249
www.rkci.com
P 210 :: 699 :: 9090
F 210 :: 699 :: 6426
TBPE Firm F-3257

SITE LOCATION MAP
PESCADITO ENVIRONMENTAL RESOURCE CENTER
TYPE I MSW MANAGEMENT FACILITY
RANCHO VIEJO WASTE MANAGEMENT, LLC
WEBB COUNTY, TEXAS
MSW PERMIT NO. 2374



PROJECT No.:	ASF13-140-00
ISSUE DATE:	02-25-15
DRAWN BY:	LAW
CHECKED BY:	PMS
REVIEWED BY:	RVK

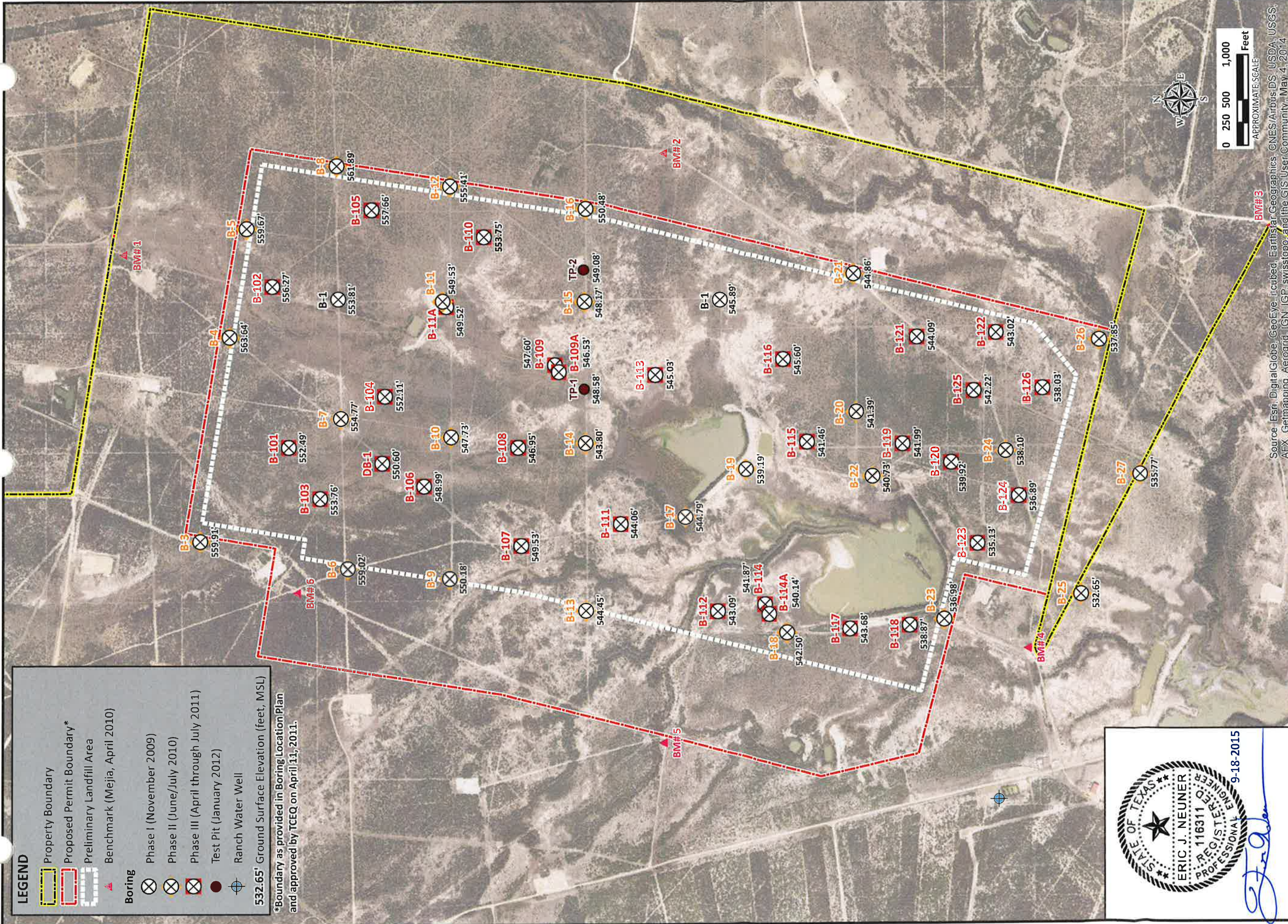
FIGURE 1

NOTE: This Drawing is Provided for Illustration Only, May Not be to Scale and is Not Suitable for Design or Construction Purposes

LEGEND

- Property Boundary
 - Proposed Permit Boundary*
 - Preliminary Landfill Area
 - Benchmark (Mejia, April 2010)
- Boring**
- Phase I (November 2009)
 - Phase II (June/July 2010)
 - Phase III (April through July 2011)
 - Test Pit (January 2012)
 - Ranch Water Well
- 532.65' Ground Surface Elevation (feet, MSL)

*Boundary as provided in Boring Location Plan and approved by TCEQ on April 11, 2011.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, May 4, 2014

Note: Benchmark locations (Benchmark Data Table) taken from Mejia Engineering Company, Boundary & Improvement Survey (Gilbert L. Cade III, R.P.L.S. #5060), April 9, 2010.

PROJECT No.:	ASF13-140-00
ISSUE DATE:	02-25-15
DRAWN BY:	LAW
CHECKED BY:	PMS
REVIEWED BY:	RVK

REVISIONS:	No.	DATE	DESCRIPTION
	1	09-18-15	

BORING/TEST PIT LOCATION MAP
 PESCADITO ENVIRONMENTAL RESOURCE CENTER
 TYPE I MSW MANAGEMENT FACILITY
 RANCHO VIEJO WASTE MANAGEMENT, LLC
 WEBB COUNTY, TEXAS
 MSW PERMIT No. 2374

RABA KISTNER ENVIRONMENTAL
 Raba Kistner Environmental, Inc.
 12821 West Golden Lane
 San Antonio, Texas 78249
 www.rkci.com
 P 210 :: 699 :: 9090
 F 210 :: 699 :: 6426
 TBPE Firm F-3257

FIGURE

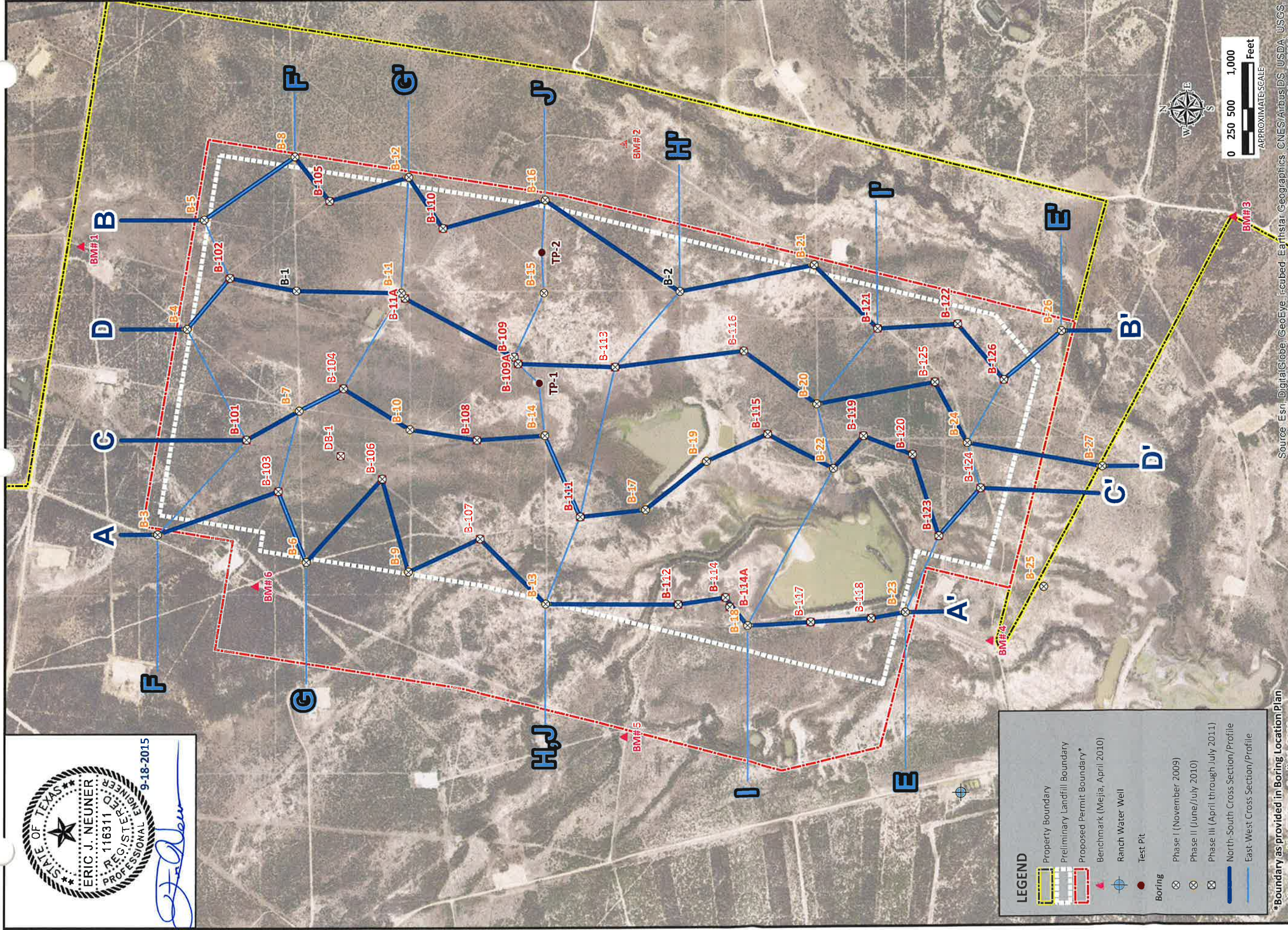
2

NOTE: This Drawing is Provided for Illustration Only. May Not be to Scale and is Not Suitable for Design or Construction Purposes



9-18-2015

Eric J. Neuner



LEGEND

- Property Boundary
- Preliminary Landfill Boundary
- Proposed Permit Boundary*
- Benchmark (Mejia, April 2010)
- Ranch Water Well
- Test Pit

Boring

- Phase I (November 2009)
- Phase II (June/July 2010)
- Phase III (April through July 2011)
- North-South Cross Section/Profile
- East-West Cross Section/Profile

*Boundary as provided in Boring Location Plan and approved by TCEQ on April 11, 2011.



Raba Kistner Environmental, Inc.
 12821 West Golden Lane
 San Antonio, Texas 78249
 www.rkci.com
 P 210 :: 699 :: 9090
 F 210 :: 699 :: 6426

TBPE Firm F-3257 / TBPG Firm 50220

Note: Benchmark locations (Benchmark Data Table) taken from Mejia Engineering Company, Boundary & Improvement Survey (Gilbert L. Cade III, R.P.L.S. #5060), April 9, 2010.

FENCE DIAGRAM INDEX MAP
 PESCADITO ENVIRONMENTAL RESOURCE CENTER
 TYPE I MSW MANAGEMENT FACILITY
 RANCHO VIEJO WASTE MANAGEMENT, LLC
 WEBB COUNTY, TEXAS
 MSW PERMIT No. 2374

REVISIONS:

No.	DATE	DESCRIPTION
1	09-18-15	

PROJECT No.:	ASF13-140-00
ISSUE DATE:	09-18-15
DRAWN BY:	LAW
CHECKED BY:	PMS
REVIEWED BY:	RVK

FIGURE

3

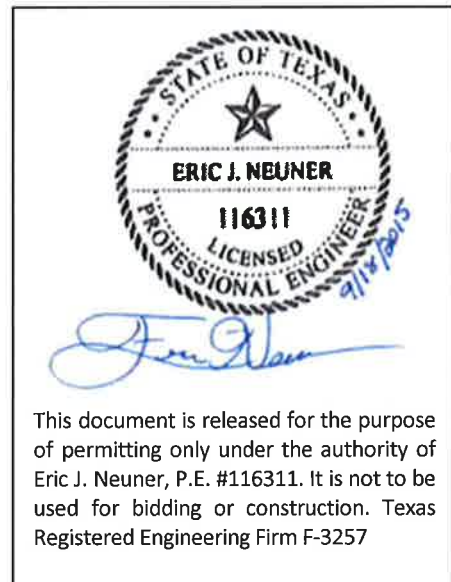
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar, Geographics, CNES/Airbus/DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, May 4, 2014

APPROXIMATE SCALE



APPENDIX A

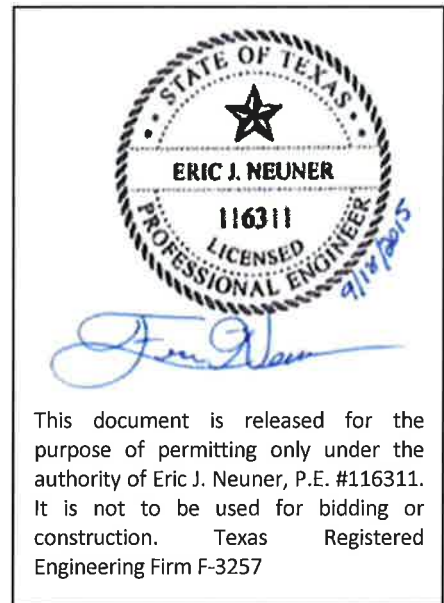
RESULTS OF SOIL SAMPLE ANALYSES



Pages 1 through 78

APPENDIX B

SUMMARY OF RESULTS AND HYDRAULIC CONDUCTIVITY TEST RESULTS



Figures B-1 through B-19

APPENDIX C

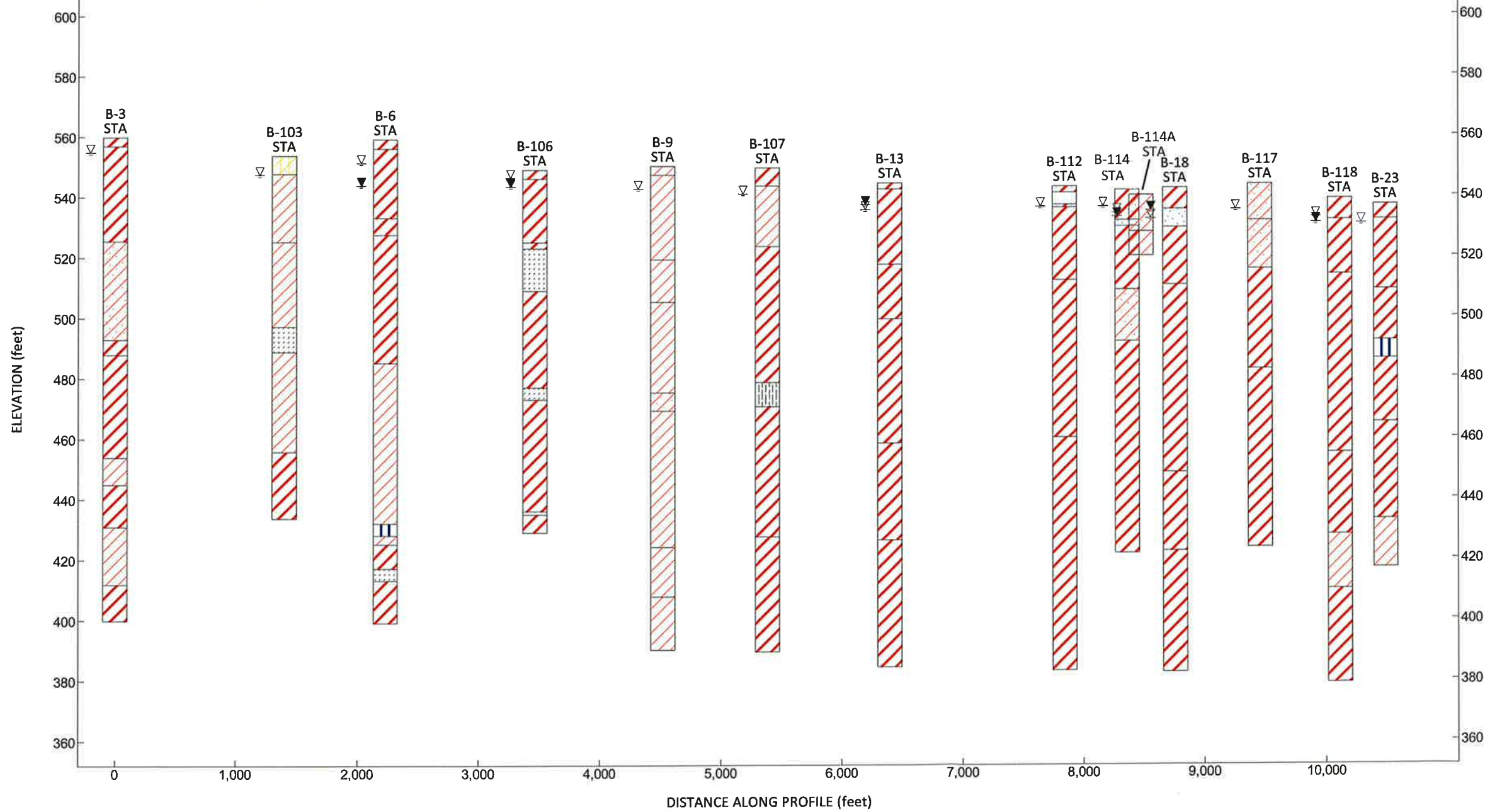
GENERALIZED SUBSURFACE FENCE DIAGRAMS MEASURED SOIL PROPERTIES (BY STRATUM)

North










South

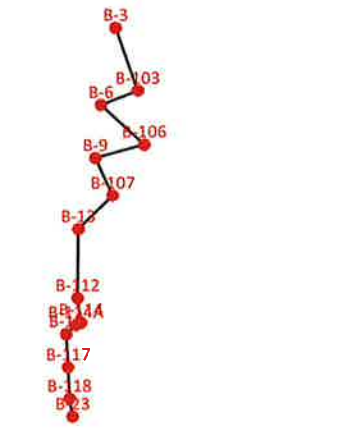
A-A

A-A'



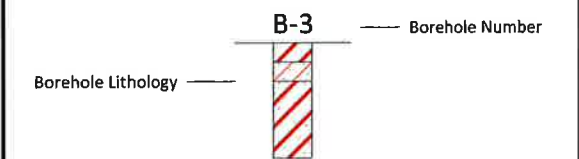
Lithology Graphics



-  FAT CLAY (CH)
-  SANDY LEAN CLAY (CL)
-  LEAN CLAY (CL)
-  SANDY FAT CLAY (CH)
-  SILT (ML)
-  SANDSTONE
-  POORLY GRADED SAND (SP)
-  SANDY SILTY CLAY (CL-ML)
-  SILTSTONE



Site Map Scale 1 inch equals 4,035 feet

Legend:



-  Water Level Reading at time of drilling.
-  Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

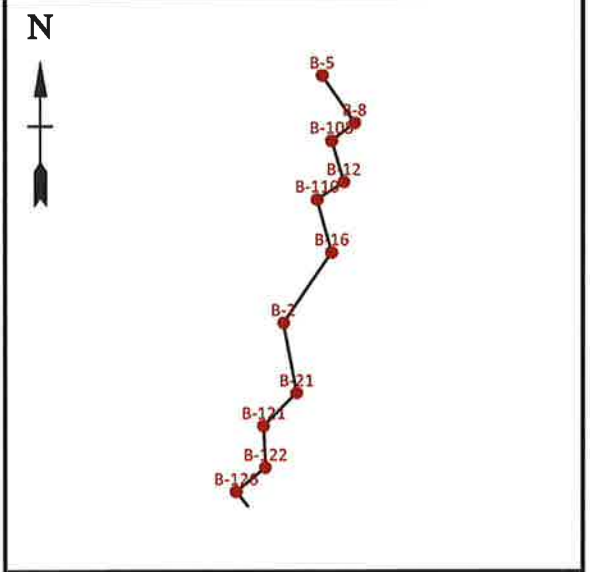
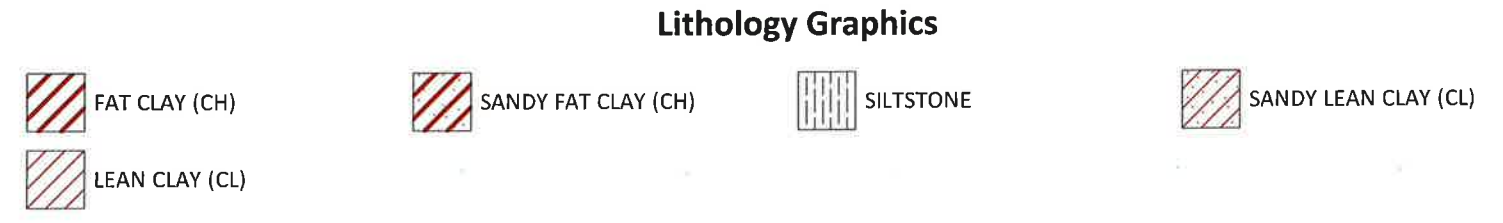
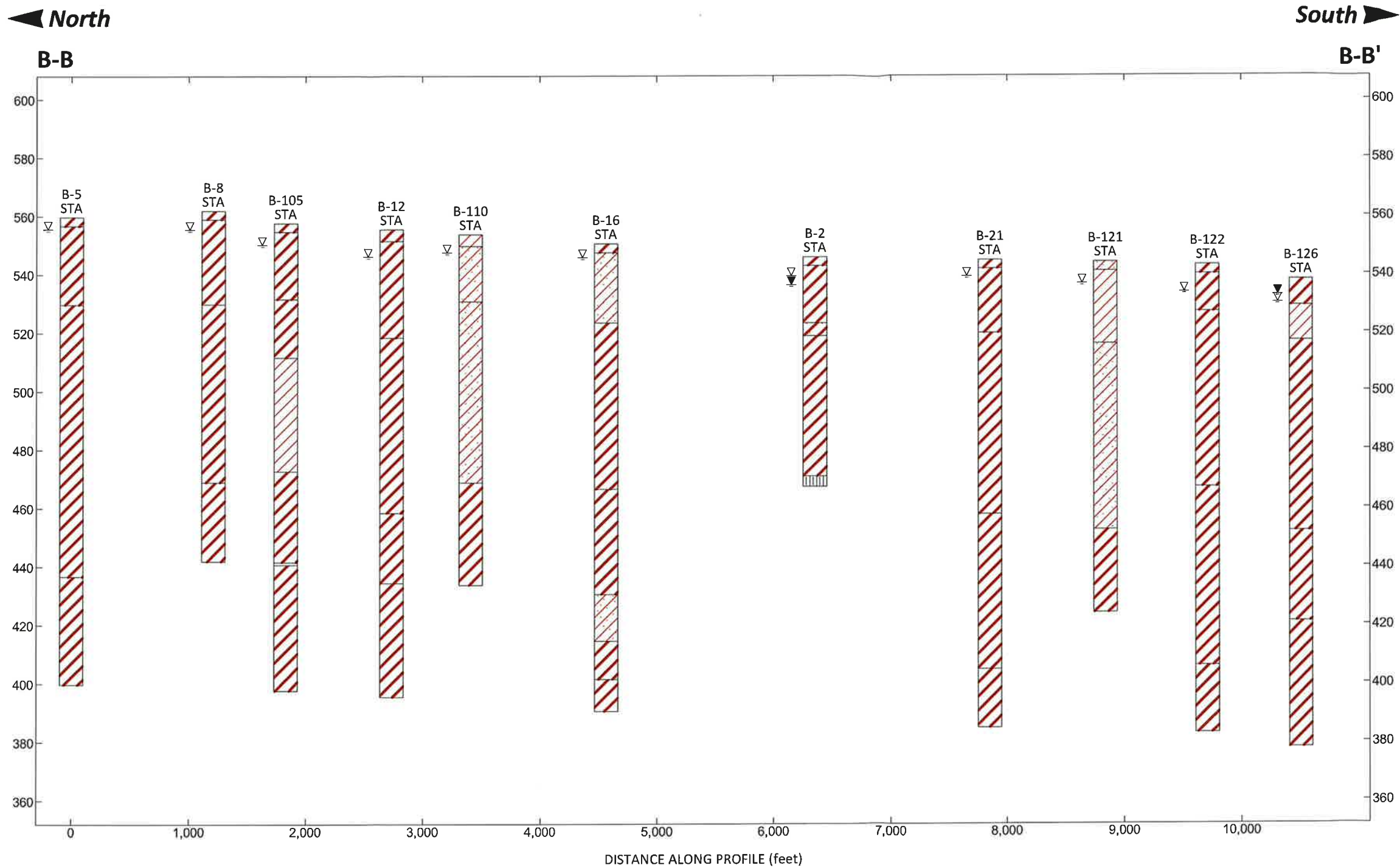
12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along A-A

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-1

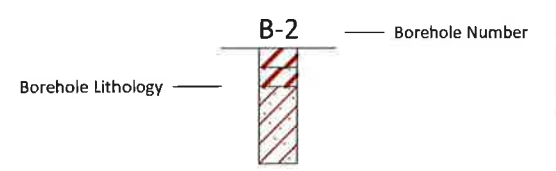
ISSUE DATE: 02-25-15
 REVISED: 09-18-15

ENVIRO - VERSIC... ASF13-140-00 PESCADITO_NOD1.GPJ RKCLGDT 9/16/15



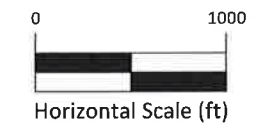
Site Map Scale 1 inch equals 4,035 feet

Legend:



- ▽ Water Level Reading at time of drilling.
- ▼ Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
San Antonio, Texas 78249
(210) 699-9090
(210) 699-6426 fax
www.rkci.com

Generalized Subsurface Fence Diagram Along B-B

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-2

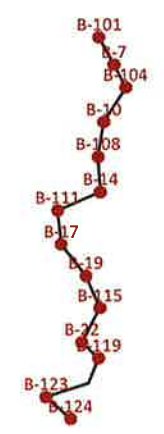
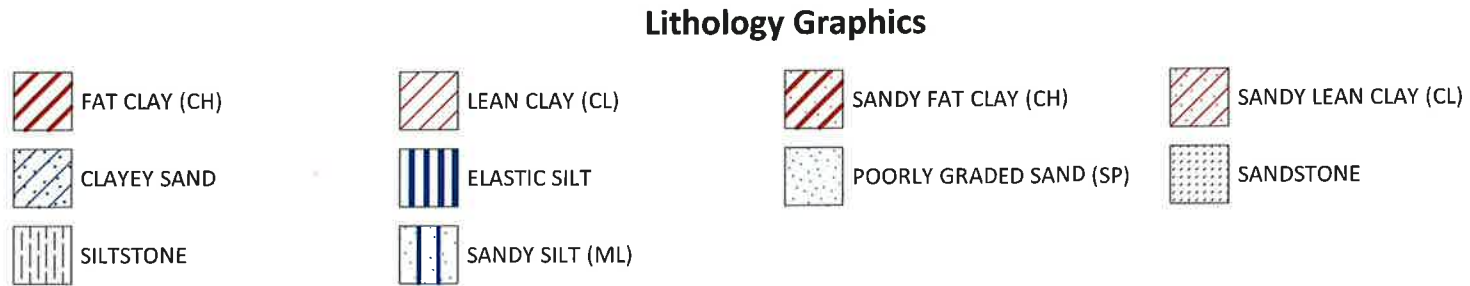
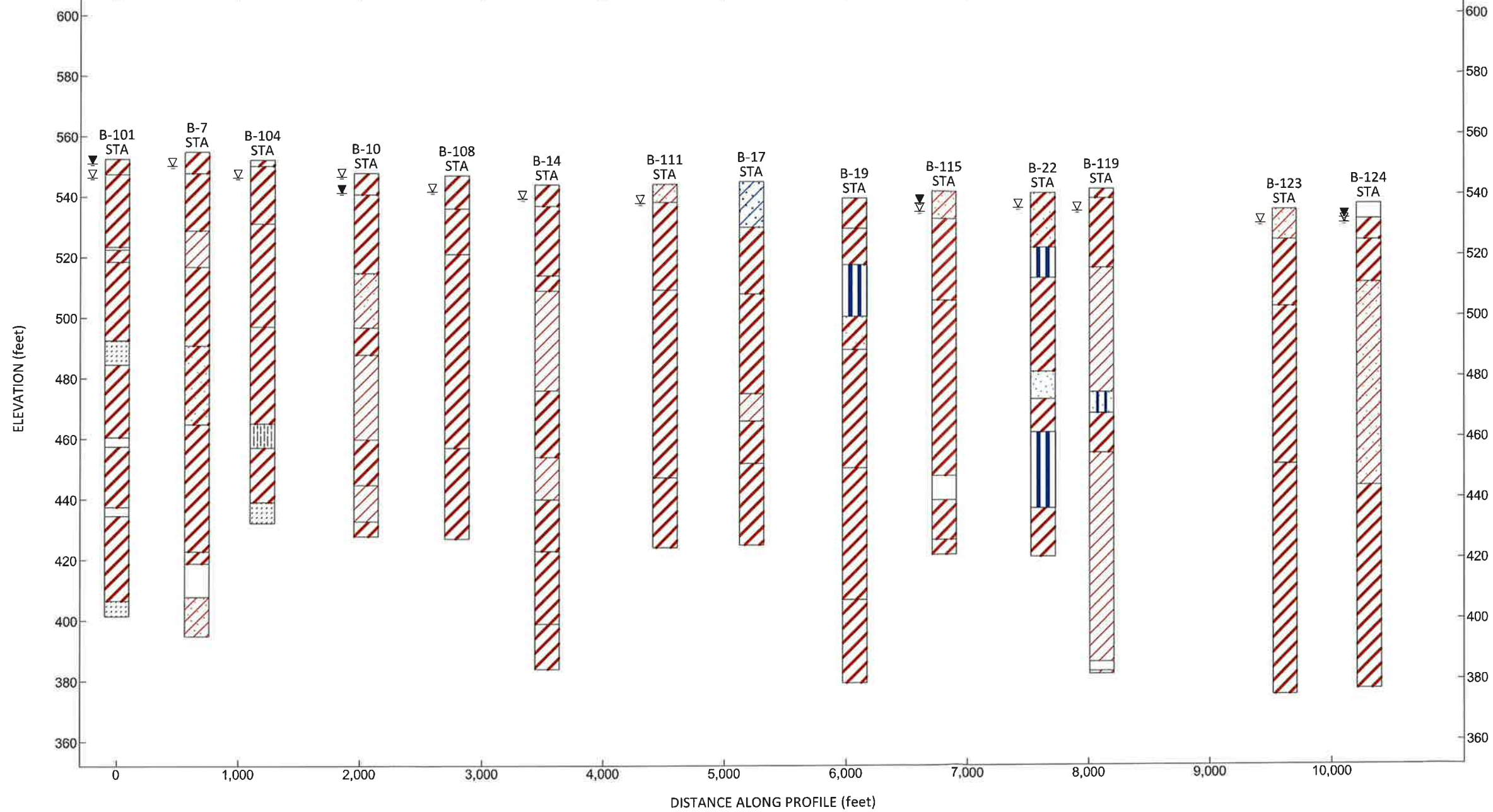
ISSUE DATE: 02-25-15
REVISED: 09-18-15

North

South

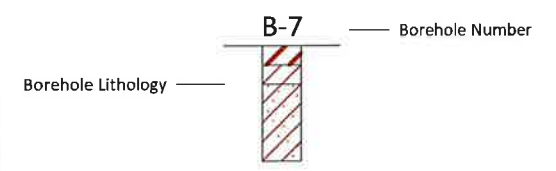
C-C

C-C'



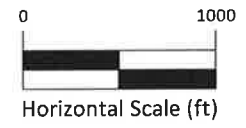
Site Map Scale 1 inch equals 4,035 feet

Legend:



- Water Level Reading at time of drilling.
- Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along C-C

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-3

ISSUE DATE: 02-25-15
 REVISED: 09-18-15

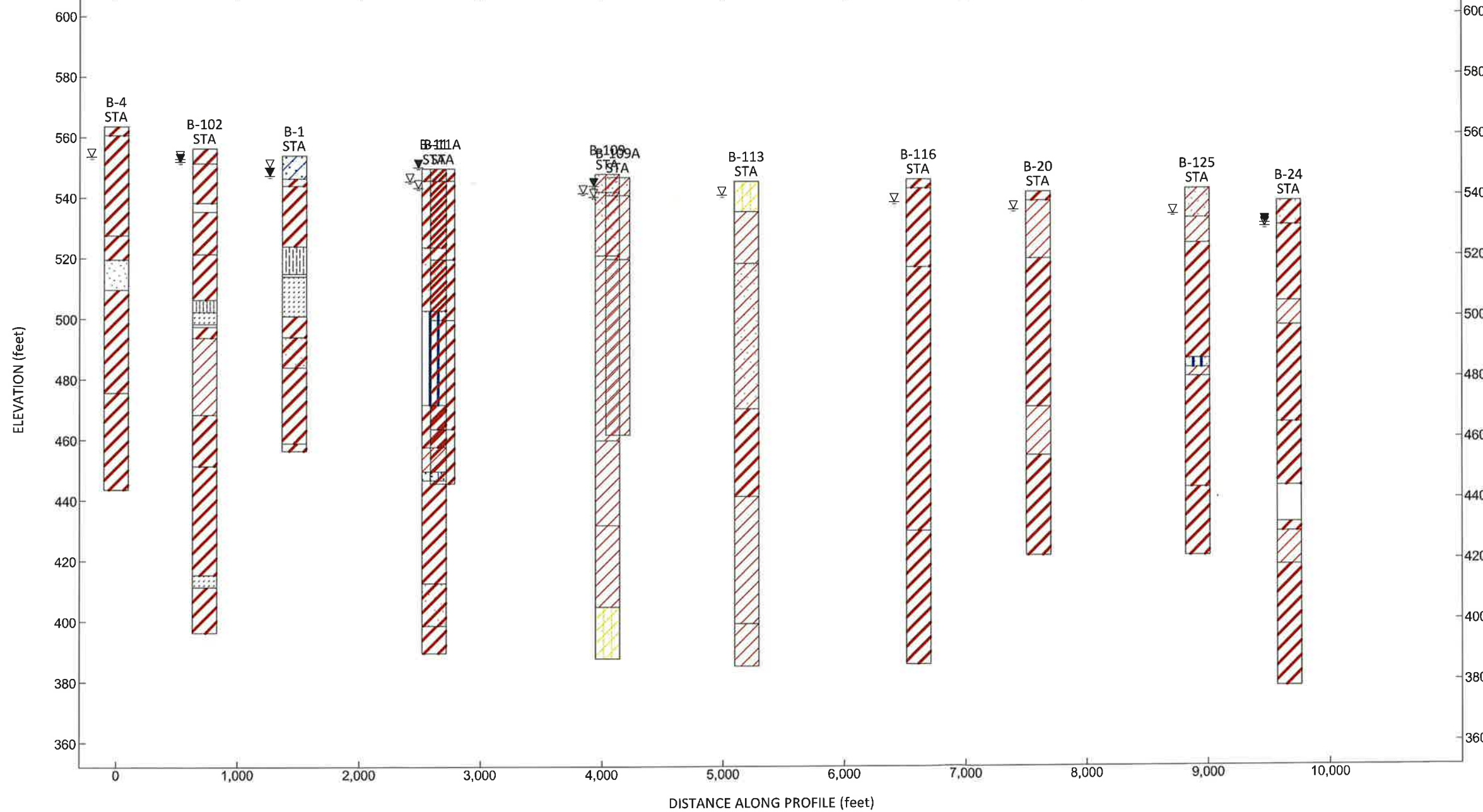
ENVIRO - VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCI.GDT 9/16/15

Northwest

Southeast

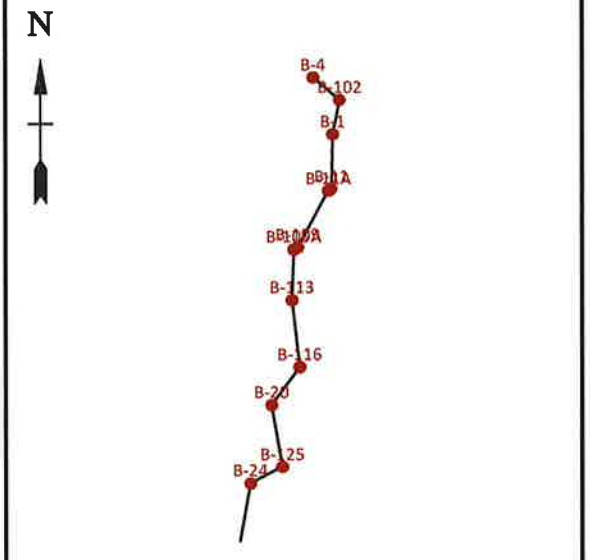
D-D

D-D'



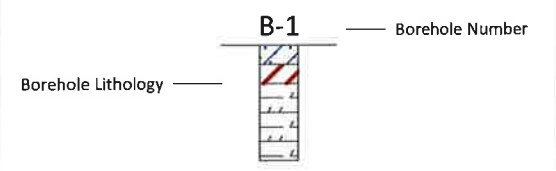
Lithology Graphics

- | | | | |
|-----------------|---------------------|-------------------------|--------------------------|
| CLAYEY SAND | FAT CLAY (CH) | SILTSTONE | CLAYSHALE |
| SANDSTONE | SANDY FAT CLAY (CH) | POORLY GRADED SAND (SP) | SILT (ML) |
| LEAN CLAY (CL) | SILTY SAND (SM) | SANDY LEAN CLAY (CL) | SANDY SILTY CLAY (CL-ML) |
| SANDY SILT (ML) | | | |



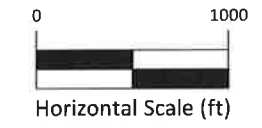
Site Map Scale 1 inch equals 4,035 feet

Legend:



- Water Level Reading at time of drilling.
- Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
Webb County, Texas - MSW Permit No. 2374

Generalized Subsurface Fence Diagram Along D-D

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-4

12821 W. Golden Lane
San Antonio, Texas 78249
(210) 699-9090
(210) 699-6426 fax
www.rkci.com

ISSUE DATE: 02-25-15
REVISED: 09-18-15

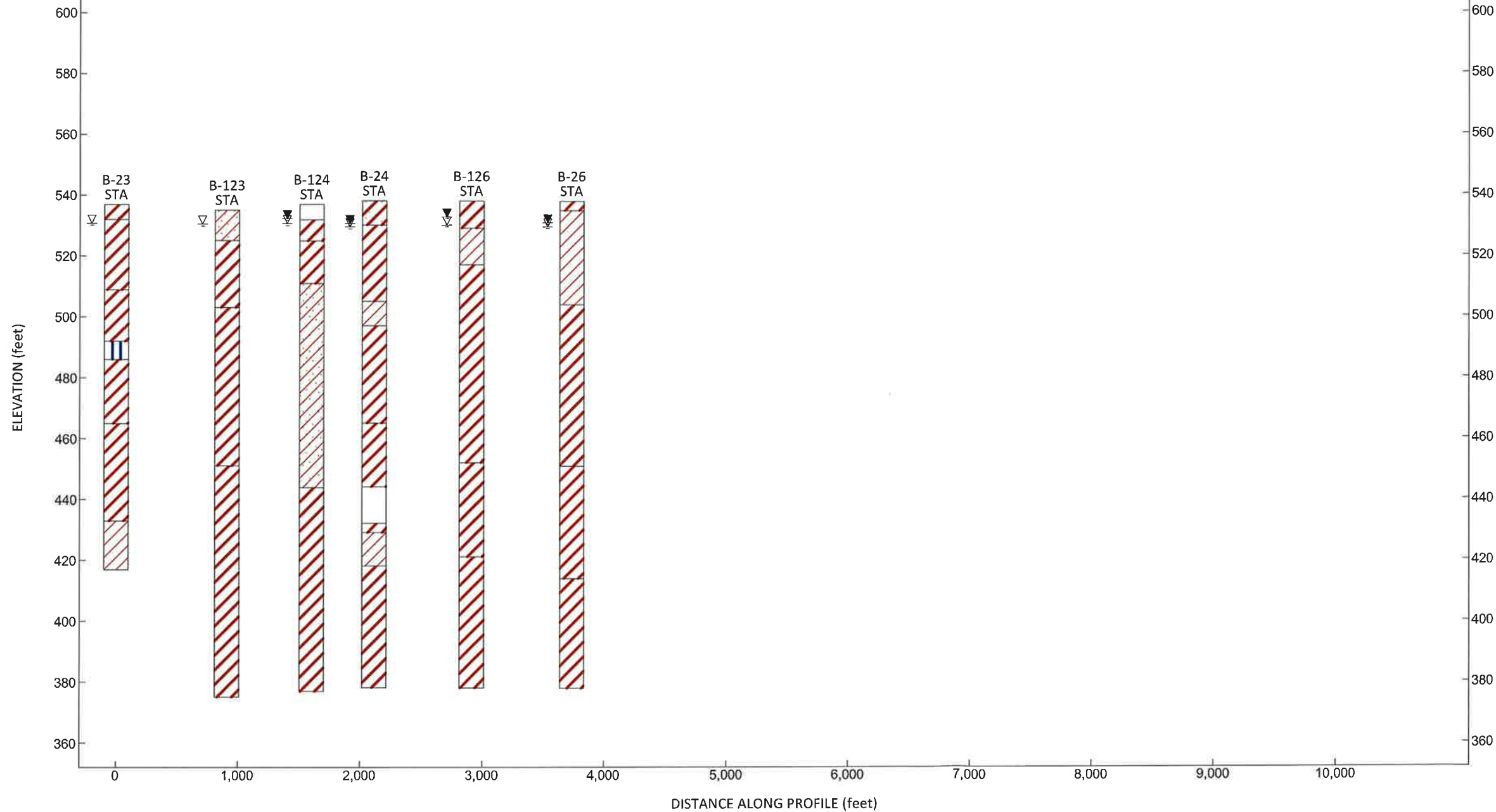
ENVIRO - VERSICOM - ASF13-140-00 PESCADITO_NOD1.GPJ RKCI.GDT 9/16/15

Northwest






Southeast

E-E

E-E'



Lithology Graphics

-  FAT CLAY (CH)
-  SILT (ML)
-  LEAN CLAY (CL)
-  SANDY FAT CLAY (CH)
-  SANDY LEAN CLAY (CL)

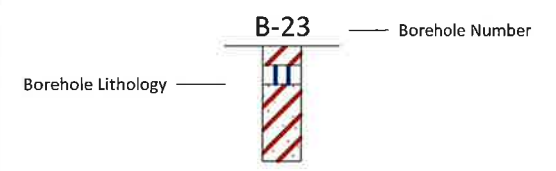




Eric J. Neuner



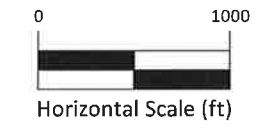
Site Map Scale 1 inch equals 4,035 feet

Legend:



-  Water Level Reading at time of drilling.
-  Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along E-E

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-5

ISSUE DATE: 02-25-15
 REVISED: 09-18-15

ENVIRO -VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCLGDT 9/16/15

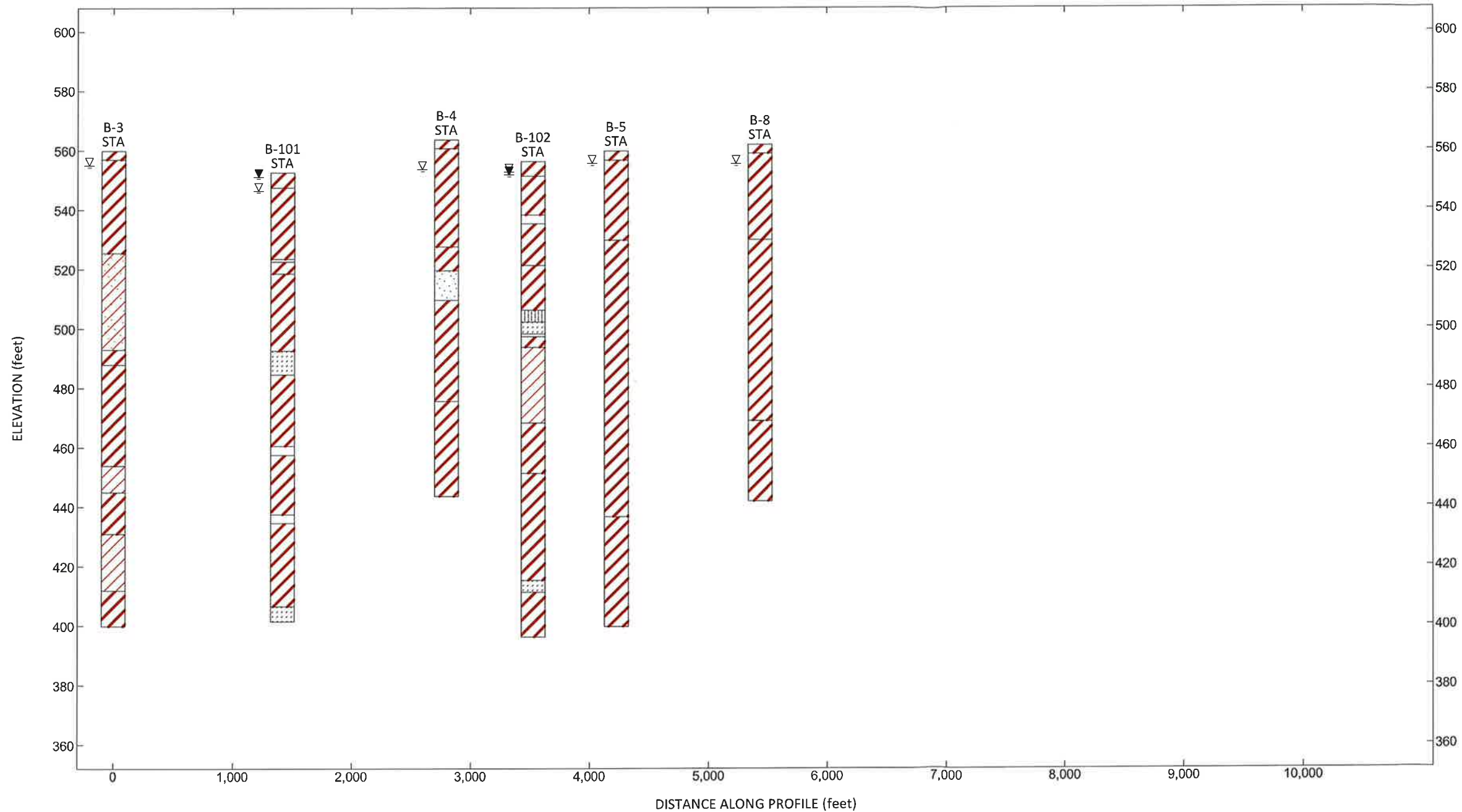
ENVIRO - VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCL.GDT 9/16/15

Northwest

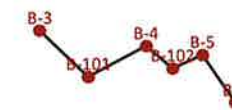
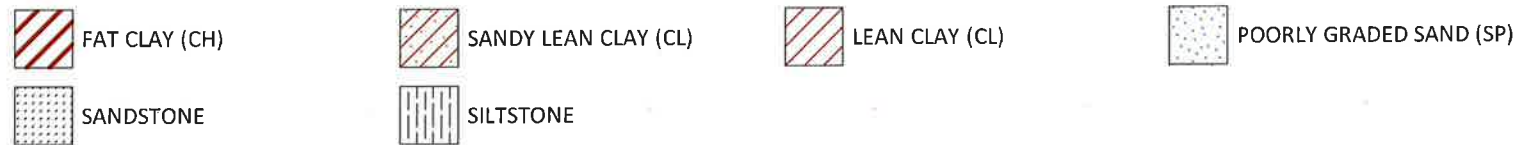
Southeast

F-F

F-F'

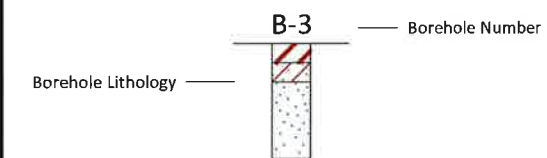


Lithology Graphics



Site Map Scale 1 inch equals 4,035 feet

Legend:



▽ Water Level Reading at time of drilling.
 ▼ Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW
 Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374



9-18-2015

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkcl.com

Generalized Subsurface Fence Diagram Along F-F

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-6

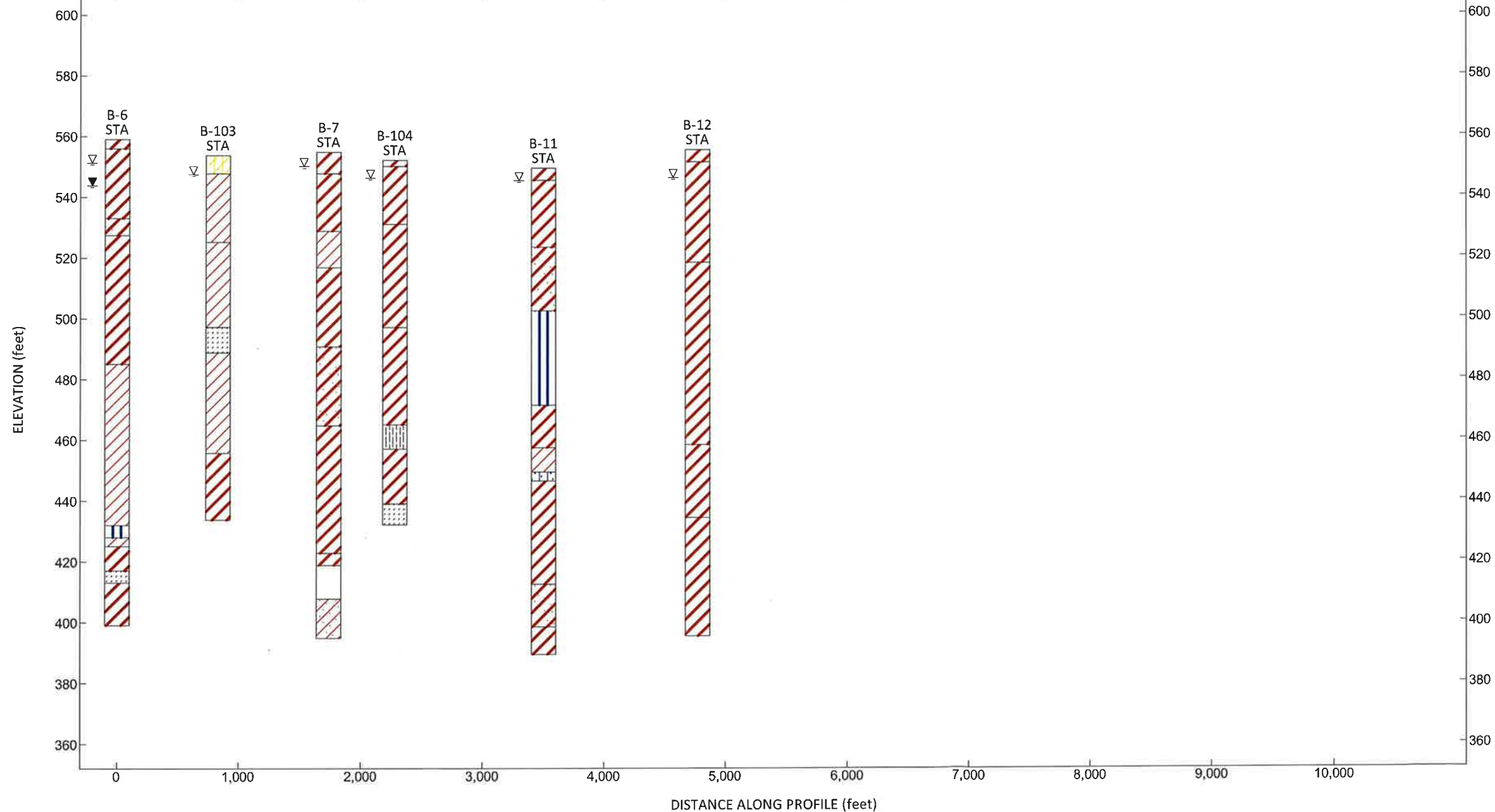
ISSUE DATE: 02-25-15
 REVISED: 09-18-15

Northwest

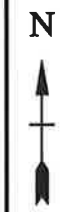
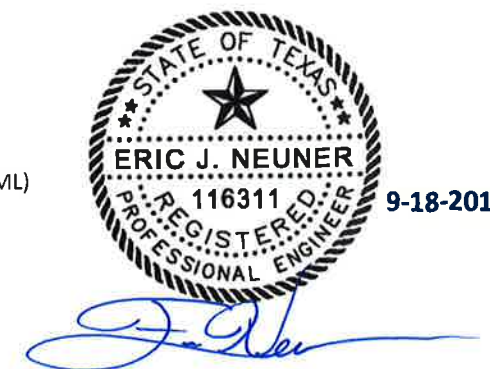
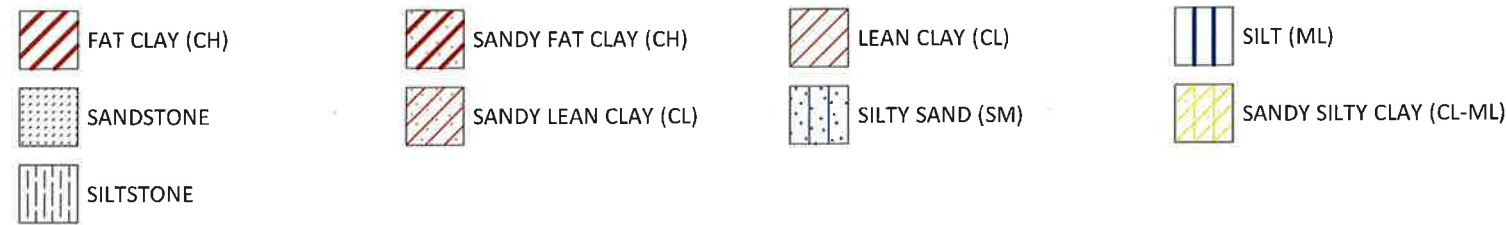
Southeast

G-G

G-G'

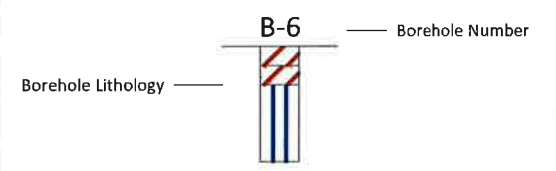


Lithology Graphics



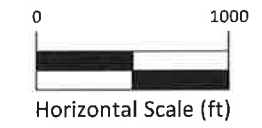
Site Map Scale 1 inch equals 4,035 feet

Legend:



- Water Level Reading at time of drilling.
- Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along G-G

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-7

ISSUE DATE: 02-25-15
 REVISED: 09-18-15

ENVIRO - VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCLGDT 9/16/15

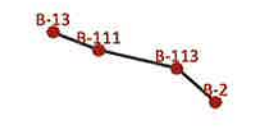
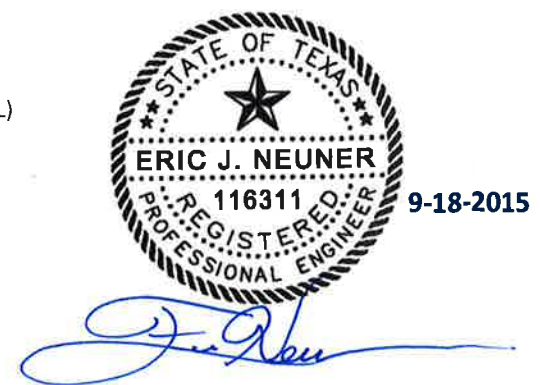
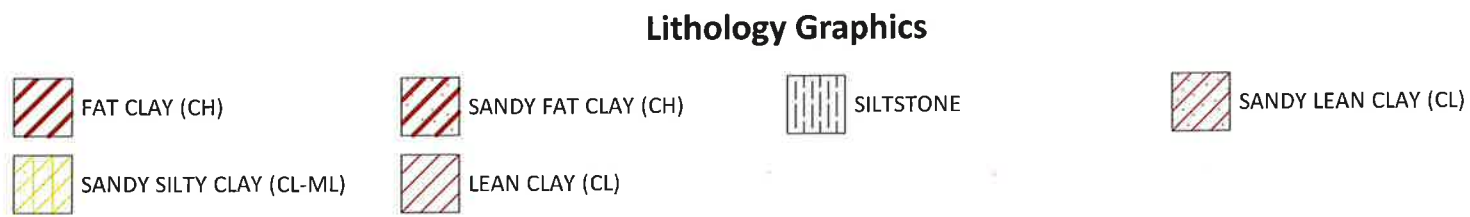
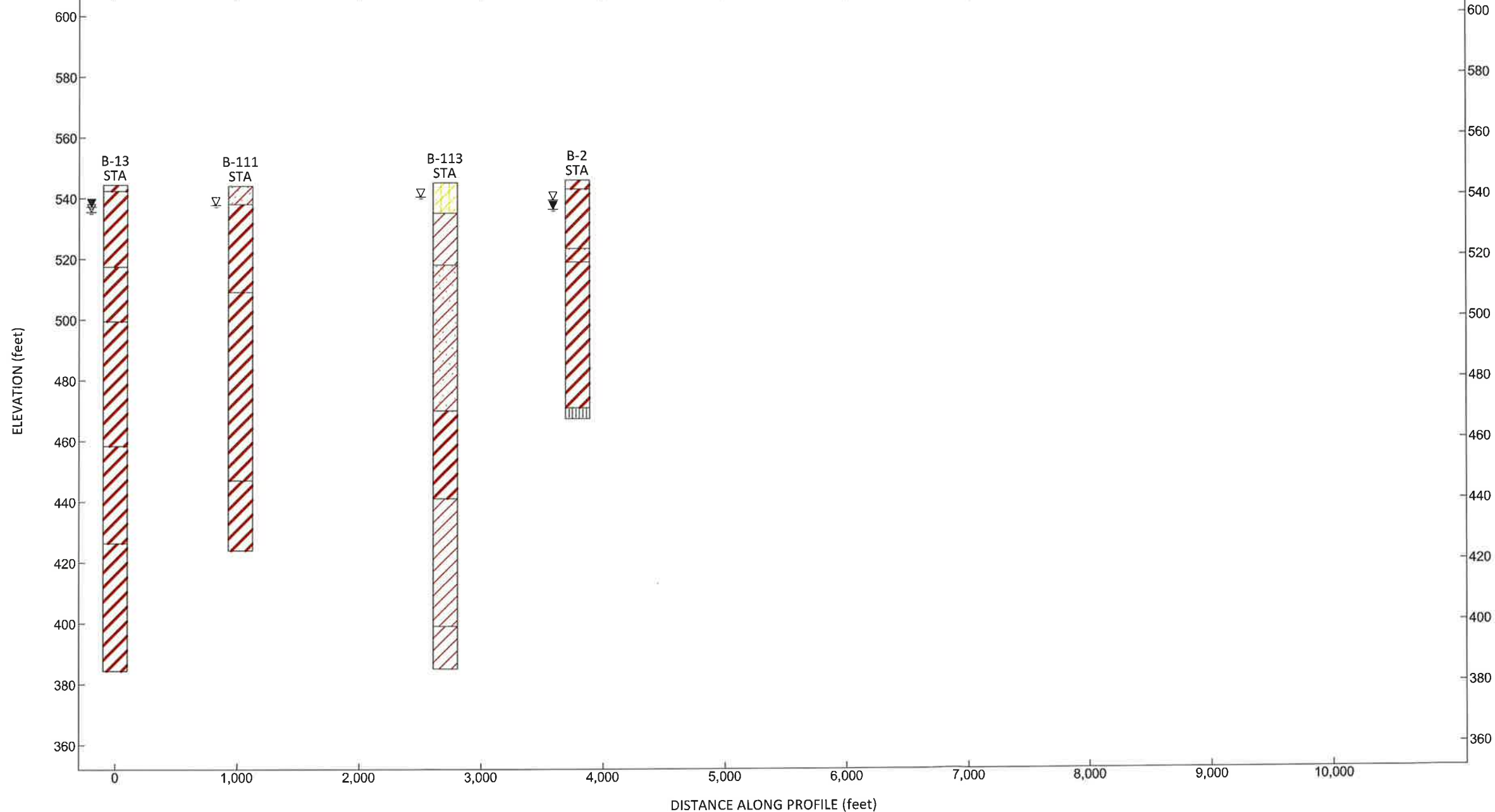
ENVIRO - VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCLGDT 9/16/15

Northwest

Southeast

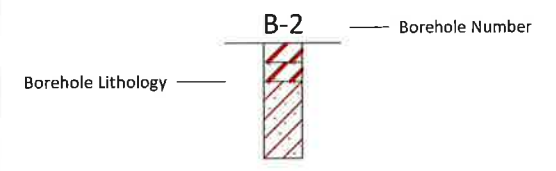
H-H

H-H'



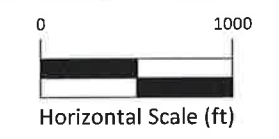
Site Map Scale 1 inch equals 4,035 feet

Legend:



- Water Level Reading at time of drilling.
- Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW Management Facility - Rancho Viejo Waste Management, LLC
Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
San Antonio, Texas 78249
(210) 699-9090
(210) 699-6426 fax
www.rkci.com

Generalized Subsurface Fence Diagram Along H-H

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-8

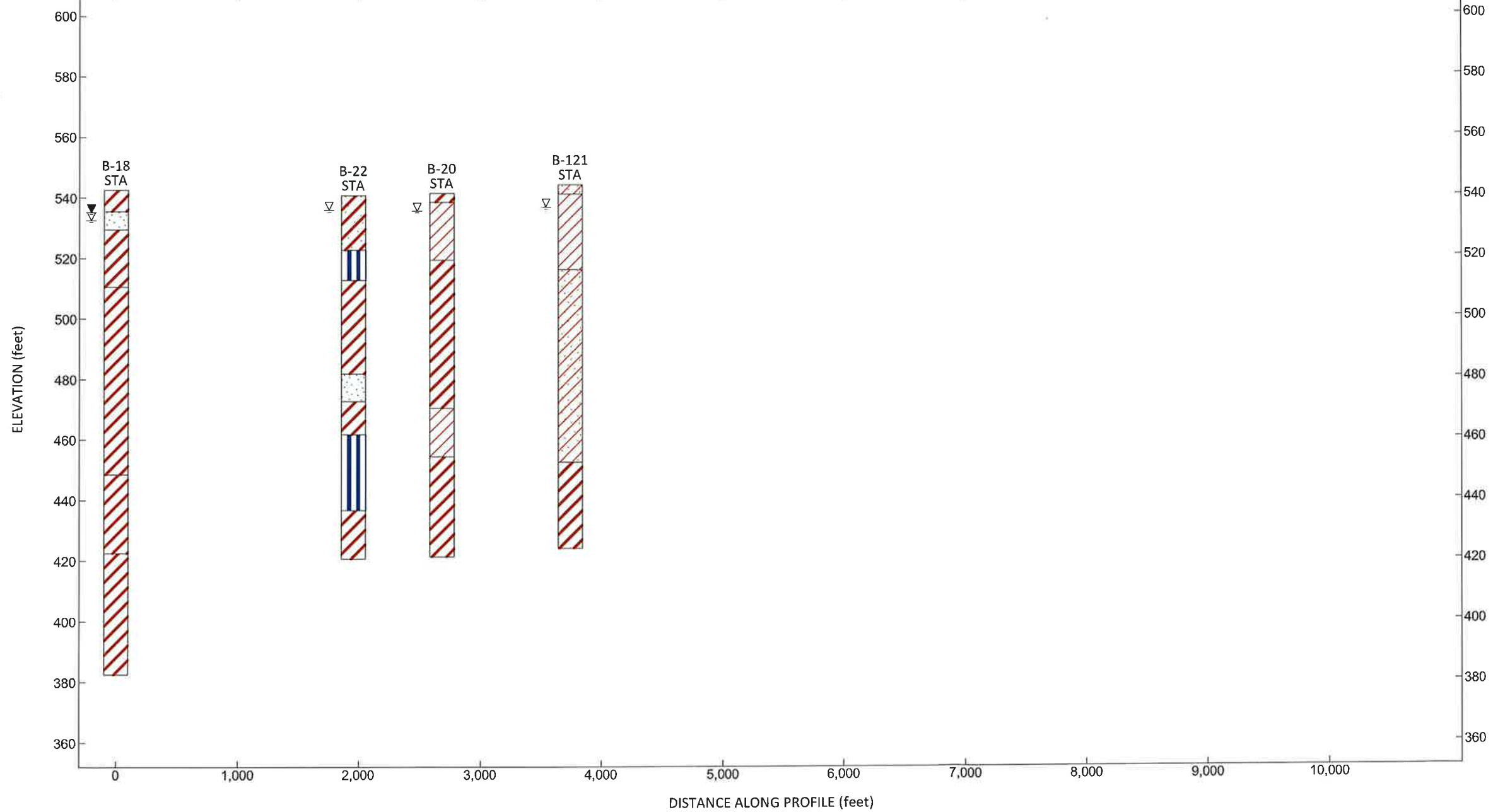
ISSUE DATE: 02-25-15
REVISED: 09-18-15

Northwest







Southeast



I-I' I-I'



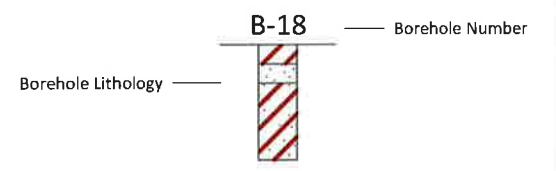
Lithology Graphics



-  FAT CLAY (CH)
-  POORLY GRADED SAND (SP)
-  LEAN CLAY (CL)
-  SANDY FAT CLAY (CH)
-  ELASTIC SILT
-  SANDY LEAN CLAY (CL)



Site Map Scale 1 inch equals 4,035 feet

Legend:



-  Water Level Reading at time of drilling.
-  Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW
 Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along I-I'

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-9

ISSUE DATE: 02-25-15
 REVISED: 09-18-15

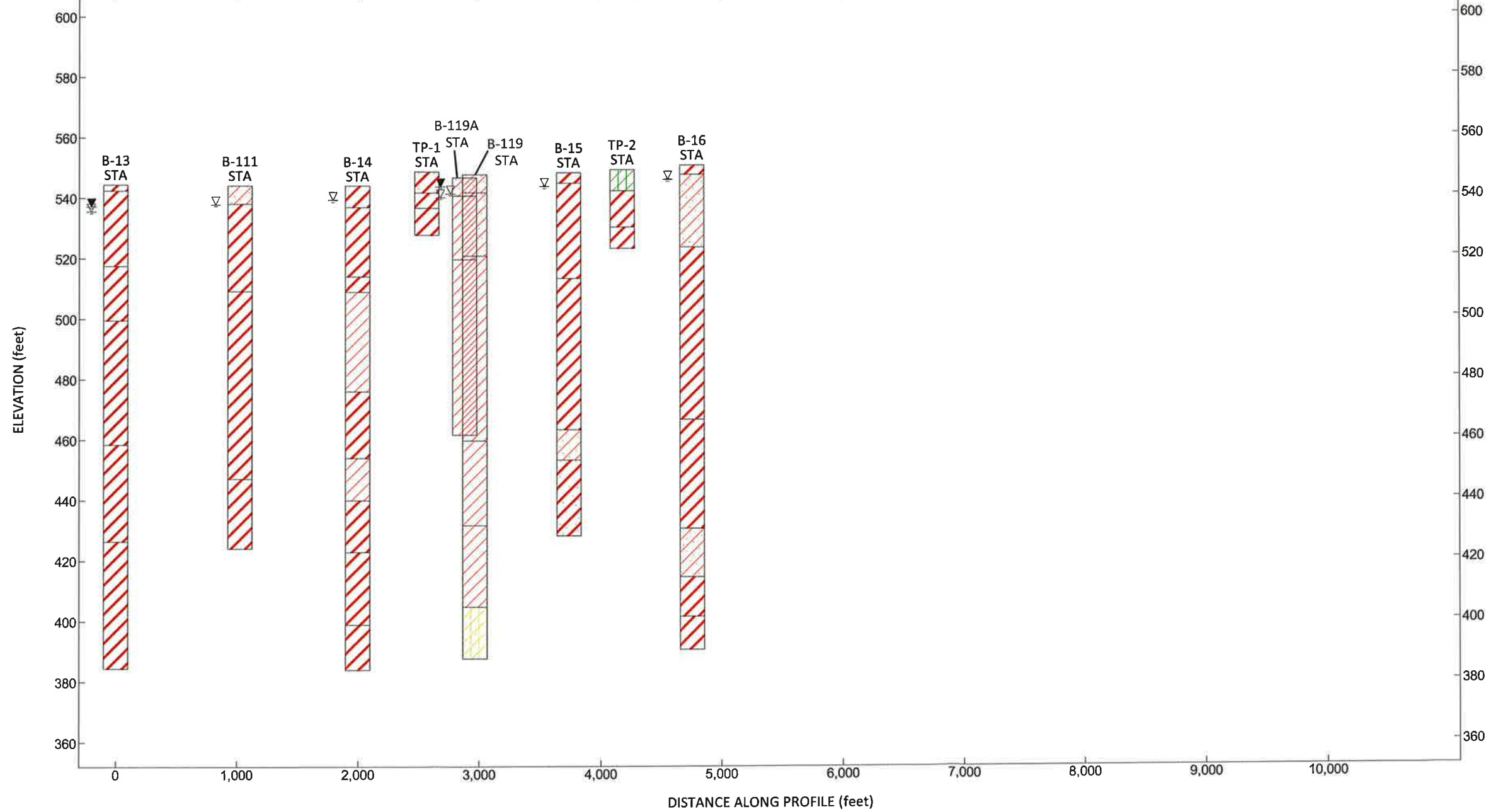
ENVIRO - VERSIC - ASF13-140-00 PESCADITO_NOD1.GPJ RKCI.GDT 9/16/15

Northwest

Southeast

J-J

J-J'



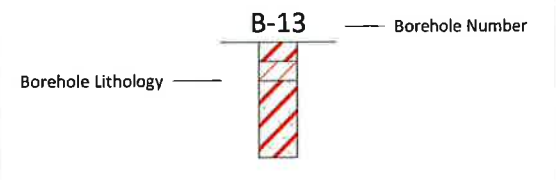
Lithology Graphics



-  FAT CLAY (CH)
-  LEAN CLAY (CL)
-  SANDY LEAN CLAY (CL)
-  SANDY FAT CLAY (CH)
-  SANDY SILTY CLAY (CL-ML)
-  SILTY CLAY (CL-ML)



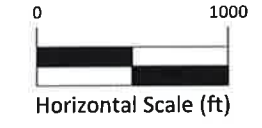
Site Map Scale 1 inch equals 4,035 feet

Legend:



-  Water Level Reading at time of drilling.
-  Water Level Reading after 24 hrs.

Horizontal Scale: 1 inch = 1000 feet
 Vertical Scale: 1 inch = 40 feet



Pescadito Environmental Resource Center - Type I MSW
 Management Facility - Rancho Viejo Waste Management, LLC
 Webb County, Texas - MSW Permit No. 2374

12821 W. Golden Lane
 San Antonio, Texas 78249
 (210) 699-9090
 (210) 699-6426 fax
 www.rkci.com

Generalized Subsurface Fence Diagram Along J-J

JOB NUMBER	FIGURE NUMBER
ASF13-140-00	FIGURE C-10

ISSUE DATE: 02-25-15
 REVISED: 09-18-15

ENVIRO - VER - N 1 ASF13-140-00 PESCADITO NOD1.GPJ RKCLGDT 9/17/15