REPORT OF GEOTECHNICAL EXPLORATION

FAMILY DOLLAR
FORT PIERCE, FLORIDA

AREHNA PROJECT NO. B-14-079

July 7, 2014

Prepared For:
La Cabana, LLC
c/o Blue Current Development
222 West Coleman Boulevard
Mount Pleasant, SC 29464

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July 7, 2014

La Cabana, LLC
c/o Blue Current Development
Attn: Eric Leineweber
222 West Coleman Boulevard
Mount Pleasant, SC 29464

eric@bluecurrentdev.com

Subject: **Report of Geotechnical Exploration**
Family Dollar
Ft. Pierce, FL
AREHNA Project No. B-14-079

Dear Mr. Leineweber,

AREHNA Engineering, Inc. (AREHNA) is pleased to submit this report of our geotechnical exploration for the proposed project. Services were conducted in general accordance with AREHNA Proposal B.Prop-14-0123 dated June 12, 2014. The purpose of our geotechnical study was to obtain information on the general subsurface conditions for the proposed new construction of a Family Dollar Store.

This report presents our understanding of the project, outlines our exploratory procedures, documents the field data obtained and includes our recommendations for site preparation and foundation design.

AREHNA appreciates the opportunity to have assisted Blue Current Development on this project. Should you have any questions with regards to this report, or if we can be of any further assistance, please contact this office.

Best Regards,

AREHNA ENGINEERING, INC.
FLORIDA BOARD OF PROFESSIONAL ENGINEERS CERTIFICATE OF AUTHORIZATION NO. 28410

Kristina LaCava, PE
Geotechnical Engineer

Joseph E. Prendergast, P.E.
Principal Geotechnical Engineer
Florida Registration 50744

Distribution: 3 – Addressee
1 – File

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1.0 EXECUTIVE SUMMARY

The purpose of this geotechnical exploration was to obtain information concerning the site and subsurface conditions at the site of the proposed new construction of a Family Dollar. The planned development includes a single story building with paved parking and drive areas and a stormwater pond. According to the Preliminary Site Plan A by LBYD, Inc., the plan area is approximately 10,000 square feet. We assume that structural loads will not exceed 100 kips for columns and 5 kips per linear foot for walls. We also assume that no more than two feet of fill and no significant cut will be needed to achieve the planned finished building grades.

AREHNA recommends that after properly stripping, proofrolling and filling the site, the building be supported on conventional shallow foundations. Shallow foundations which bear on suitable existing soils or structural fill may be designed for a net maximum allowable bearing pressure of 2,500 pounds per square foot (psf).

General recommendations for site development, as well as foundation and pavement design are presented in this report.

2.0 PROJECT INFORMATION AND SCOPE OF WORK

2.1 Site Description and Project Characteristics

The site is located on the north side of Orange Avenue between N 18th Street and N 17th Street in Ft. Pierce, Florida. The project site is currently under consideration for construction of a new Family Dollar retail store with associated paved roadway and parking areas and one stormwater pond to the north of the proposed building. We have assumed that structural loads for the retail store will not exceed 100 kips for columns and 5 kips per linear foot (klf) for walls. The proposed construction area currently houses two residential buildings.

2.2 Scope of Work

The purpose of our geotechnical study was to obtain information on the general subsurface conditions at the proposed project site. The subsurface materials encountered were evaluated with respect to the available project characteristics. In this regard, engineering assessments for the following items were formulated:

- Identification of the existing ground water levels and estimated normal seasonal high ground water fluctuations.
- General location and description of potentially deleterious materials encountered in the borings which may have an impact on the proposed construction.
- Allowable capacities and foundation settlement for foundations supporting the structure.
- General site preparation recommendations including the suitability of soils for structural fill.
- Field vertical permeability results using Double Ring Infiltration (DRI) testing. Horizontal permeability values will be estimated based on the vertical permeability results.

The following services were performed to achieve the above-outlined objectives:

- Requested utility location services from Sunshine State One-Call.
- Performed four Standard Penetration Test (SPT) borings extending to a depth of 20 feet within the proposed structure area. Samples were collected and Standard Penetration Test resistances were measured at approximate intervals of two feet for the top ten feet and at approximate intervals of five feet thereafter.
- Performed three hand auger borings to a depth of 5 feet within the proposed paved parking and driveway areas.
- Performed one Double Ring Infiltration (DRI) test and one SPT boring to a depth of 10 feet within the proposed stormwater pond area.
- Visual classification and stratification of soil samples in the laboratory using the Unified Soil Classification System.

- Report the results of the field exploration, lab testing and engineering analysis. The results of the subsurface exploration are presented in this report, signed and sealed by professional engineers specializing in geotechnical engineering.

3.0 FIELD EXPLORATION

3.1 Field Exploration

Our scope included four Standard Penetration Test (SPT) borings performed within the proposed building footprint to depths of 20 feet, three hand auger borings to depths of 5 feet performed within the paved parking and driveway areas, and one Double Ring Infiltration (DRI) test with one SPT boring extending to a depth of 10 feet within the proposed stormwater pond area.

The SPT borings were performed with the use of a Power Drill Rig using Bentonite "Mud" drilling procedures. Samples were collected and Standard Penetration Test resistances were measured at approximate intervals of two feet for the top ten feet and at approximate intervals of five feet thereafter. The soil sampling was performed in general accordance with ASTM Test Designation D-1586, entitled "Penetration Test and Split-Barrel Sampling of Soils."

The auger borings were performed by manually advancing a 3-inch diameter, 6-inch long sampler into the soil until the sampler was full. The sampler was then retrieved and the soils in the sampler were removed and visually classified. The soil sampling was performed in general accordance with ASTM Test Designation D-1452, entitled "Soil Investigation and Sampling by Auger Borings." The holes were backfilled after the borings were completed.

Representative portions of these soil samples were sealed in glass jars, labeled and transferred for appropriate classification.

In **Appendix A**, this report provides a boring location site plan showing the relationship of the proposed building to the exploration borings. The borings were located in the field by measuring from existing features.

4.0 SUBSURFACE CONDITIONS

4.1 USDA Natural Resources Conservation Service Data

A review of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) survey for St. Lucie County, attached as **Figure 4**, indicates that the soils at the project site consist of Lawnwood-Urban land complex (mapping unit 22) and Waveland-Urban land complex (mapping unit 52). The NRCS published profiles typically reports soils extending to 80 inches below the ground surface. Excerpts from the published Soil Survey are provided below for reference:

Characteristics of Lawnwood-Urban land complex [22]: This complex consists of Lawnwood soils and Urban land so intermingled that they cannot be separated at the scale used for mapping. Slope ranges from 0 to 2 percent. Typically, the surface layer of the Lawnwood soils is 8 inches thick. It is black sand in the upper 4 inches and very dark gray sand in the lower 4 inches. The subsurface layer is gray and light gray sand 20 inches thick. The subsoil extends to a depth of 58 inches. It is black, weakly cemented sand in the upper 24 inches and dark reddish brown sand in the lower 6 inches. The substratum, to a depth of 80 inches or more, is pale olive sand.

The areas of Urban land are covered by houses, streets, driveways, buildings, parking lots, and other uses. Unoccupied areas are mostly lawns, vacant lots, or playgrounds made up of Lawnwood soils. These areas are so small and intermixed with Urban land that it is impractical to map them separately.

Characteristics of Waveland-Urban land complex [54]: This complex consists of Waveland soils and Urban land that are so intermingled that they cannot be separated at the scale used for mapping. Slope ranges from 0 to 2 percent. Typically, the surface layer of the Waveland soils is fine sand 8 inches thick. It is black in the upper 4 inches and dark gray in the lower 4 inches. The subsurface layer is grayish brown sand and light gray fine sand 24 inches thick. The subsoil is black, weakly cemented loamy sand to a depth of 53 inches. The substratum, to a depth of 80 inches or more, is sand that has pockets of sand and sandy loam.

The areas of Urban land are covered by houses, streets, driveways, buildings, parking lots, and other uses. Unoccupied areas are mostly lawns, vacant lots, or playgrounds made up of Waveland soils. These areas are so small and intermixed with Urban land that it is impractical to map them separately.

4.2 USGS Topographic Data

The topographic survey map published by the United States Geological Survey was reviewed for ground surface features at the proposed project location (**Figure 3**, **Appendix A**). Based on this review, the natural ground surface elevation at the project site is approximately +20 feet National Geodetic Vertical Datum of 1929 (NGVD).

4.3 Subsurface Conditions

A pictorial representation of the subsurface conditions encountered in the borings is shown on the General Subsurface Profile, **Figure 5** in **Appendix B**. These profiles and the following soil conditions highlight the general subsurface stratification. The Soil Test Boring Records in **Appendix B** should be consulted for a detailed description of the subsurface conditions encountered at each boring location. When reviewing the boring records and the subsurface profiles, it should be understood that soil conditions may vary between and away from boring locations.

The SPT borings generally encountered very loose to dense sands or various fines (SP, SP-SC, SP-SM, and SC) from the ground surface to the terminations depths of 10 to 20 feet. Standard penetration test resistances (N-values) ranged from 3 to 37 blows per foot. The hand auger borings encountered fine sand (SP) to the termination depths of 4.5 and 5 feet.

A page defining the terms and classification symbols used in the boring profiles is included in **Appendix B** of this report.

4.4 Groundwater Conditions

The ground water level was encountered at a depth of 9 feet in the SPT borings performed. Fluctuation in ground water levels should be expected due to seasonal climatic changes, construction activity, rainfall variations, surface water runoff, and other site-specific factors.

Since ground water level variations are anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based on the assumption that variations will occur.

4.5 Estimated Seasonal High Ground Water Level

Based on the results of the SPT borings and our experience in the area, we estimate that the seasonal high ground water level will be encountered approximately 8 feet below the existing ground surface. Ground water may perch on the relatively impermeable clayey soils encountered in the borings at depths as shallow as 6 feet during periods of heavy rainfall.

4.6 Double Ring Infiltration Test Results

The following table summarizes the DRI Test Results:

Test Location	Depth of Test, feet	Final Vertical Infiltration Rate, in/hr	Estimated Horizontal Infiltration Rate, in/hr
DRI-01	2.0	30	45

The groundwater level was encountered at a depth of 9 feet in the SPT boring performed adjacent to the DRI location. The above vertical infiltration rate is the actual value found. No factor of safety has been applied.

A summary of the DRI tests performed is attached in **Appendix B.**

5.0 DESIGN RECOMMENDATIONS

5.1 General

Our geotechnical evaluation is based upon the previously presented project information as well as the field data obtained during this geotechnical exploration. If the final structure location or foundation loads are significantly different from those described or if the subsurface conditions during construction are different from those revealed by our borings, we should be notified immediately so that we may review the recommendations presented in this report.

After clearing and stripping, including removal of any existing foundations and pavements, the proposed structure area should be proofrolled and compacted. Any areas that appear unstable under proofrolling should be replaced with compacted fill. Our recommended site preparation is presented in Section 6.0, General Site Preparation.

5.2 Shallow Foundation Design

Following our recommended General Site Preparations, the proposed building can be constructed on a system of conventional shallow spread or strip footings and interior slab-on-grade. The foundation system may bear on compacted acceptable existing soils or compacted structural fill soils. Shallow foundations may be designed using an allowable net soil bearing pressure of 2,500 psf. Our bearing capacity evaluation was based on correlations between N-values and the successful performance of similar structures on similar soil conditions.

All footings should be embedded so that the bottom of the foundation is a minimum of 12 inches below the adjacent compacted grades on all sides. Strip or wall footings should be a minimum of 18 inches wide and pad or column footings should be a minimum of 24 inches wide; however, the pad or column footings should be sized to maintain similar bearing pressure as the wall footings. These minimum footing sizes should be used regardless of whether the maximum allowable bearing pressures are fully developed in all loading conditions. These minimum footing sizes tend to provide adequate load bearing area to develop overall bearing capacity and account for minor variations in the bearing materials.

5.3 Settlement

The settlement of shallow foundations supported on sandy soils should occur rapidly during construction as dead loads are imposed at the footing locations. Provided that the recommended subsurface preparation operations are properly performed, the total settlements of isolated columns and wall footings should be on the order of ¾ inch, with differential settlements on the order of 50 percent of the total settlements.

6.0 GENERAL SITE PREPARATION

6.1 General

The initial step in site preparation should be the complete removal of all existing buildings, pavements, topsoil, root, debris, and other deleterious materials from beneath and to a minimum of five feet beyond the development perimeter. Also, prior to construction, the location of any existing foundations, underground irrigation, septic tanks, drainage, or other utility lines within the construction area should be established. In this regard it should be noted that, if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion which subsequently may result in excessive settlements. The structure areas should then be inspected and thoroughly proofrolled as directed by a Geotechnical Engineer. Our recommendations listed in this section should be used as a guideline for the project general specifications prepared by the Design Engineer:

- The entire site should be proofrolled with a large vibratory roller with a 4-foot diameter drum and a static weight of at least 8 tons. At least 8 complete coverages (4 in each perpendicular direction) should be performed over the entire building and parking area prior to raising site grades. Careful observations should be made during proofrolling to help identify any areas of soft-yielding soils that may require over excavation and replacement.

- Following satisfactory completion of the proofrolling, additional fill should be placed and compacted as needed to achieve the desired grades. Fill should generally consist of clean fine sand with less than 12 percent passing the No. 200 sieve, free of rubble, organics, clay, debris and other unsuitable material. Fill should be tested and approved prior to acquisition.

- Approved sand fill should be placed in loose lifts not exceeding 12 inches in thickness and should be compacted to a minimum of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557). The upper foot of pavement and floor slab subgrade should be compacted to at least 98 percent of a Modified Proctor. Density tests to confirm compaction should be performed on each fill lift prior to placement of the subsequent lift.

- Prior to beginning compaction, soil moisture contents should be adjusted in order to facilitate proper compaction. A moisture content within 2 percentage points of the optimum indicated by the Modified Proctor Test (ASTM D-1557) is recommended prior to compaction of the natural ground and fill material.

- Immediately prior to reinforcing steel placement, it is suggested that the bearing surfaces of all footing and floor slab areas be compacted using hand-operated mechanical tampers. In this manner, any localized areas which have been loosened by excavation operations should be adequately recompacted.

- A qualified materials testing laboratory should be retained to provide on-site observation of earthwork and ground modification activities. Density tests should be performed on the top one foot of compacted existing ground, on each fill lift, and at the bottom of foundation excavations.

6.2 Ground Water Control

Depending upon the seasonal conditions, runoff from adjoined sites and pavements may result in intrusion of surface water until drainage structures are emplaced. Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as physical disturbance or rain. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete should be placed the same day that the footing excavation is made. If this is not possible, the footing excavations should be adequately protected.

6.3 On-Site Soil Suitability

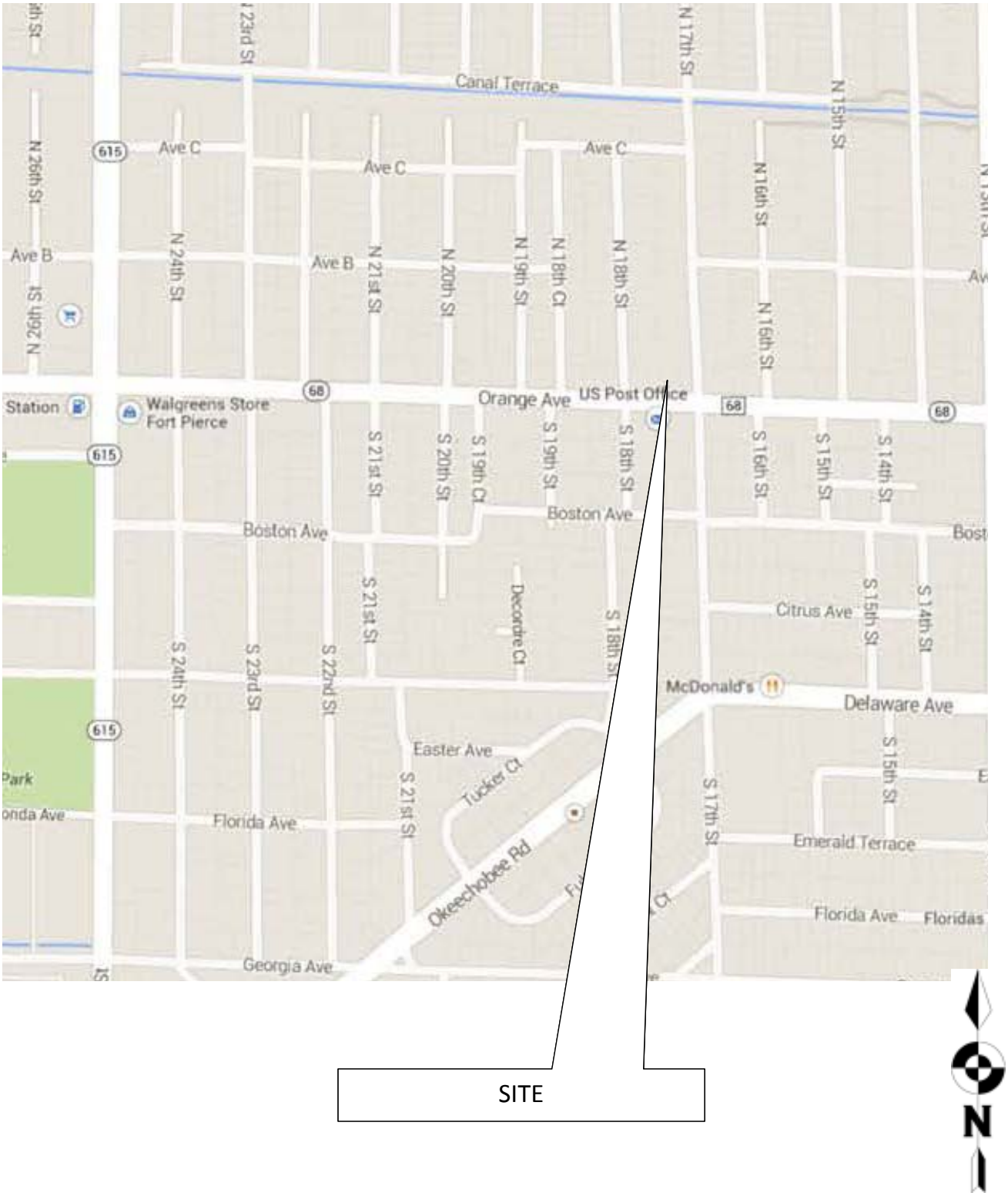
The borings indicate that the soils present at the site to should be generally suitable for fill. Classification indicates the soils at this site to a depth of 6 feet consist of fine sands classified as SP, SP-SC, and SP-SM based on the Unified Soil Classification System (USCS). Suitable structural fill materials should consist of fine to medium sand with less than 12 percent passing the No. 200 sieve and be free of rubble, organics, clay, debris and other unsuitable material. Any off-site materials used as fill should be approved by AREHNA prior to acquisition.

7.0 BASIS FOR RECOMMENDATIONS

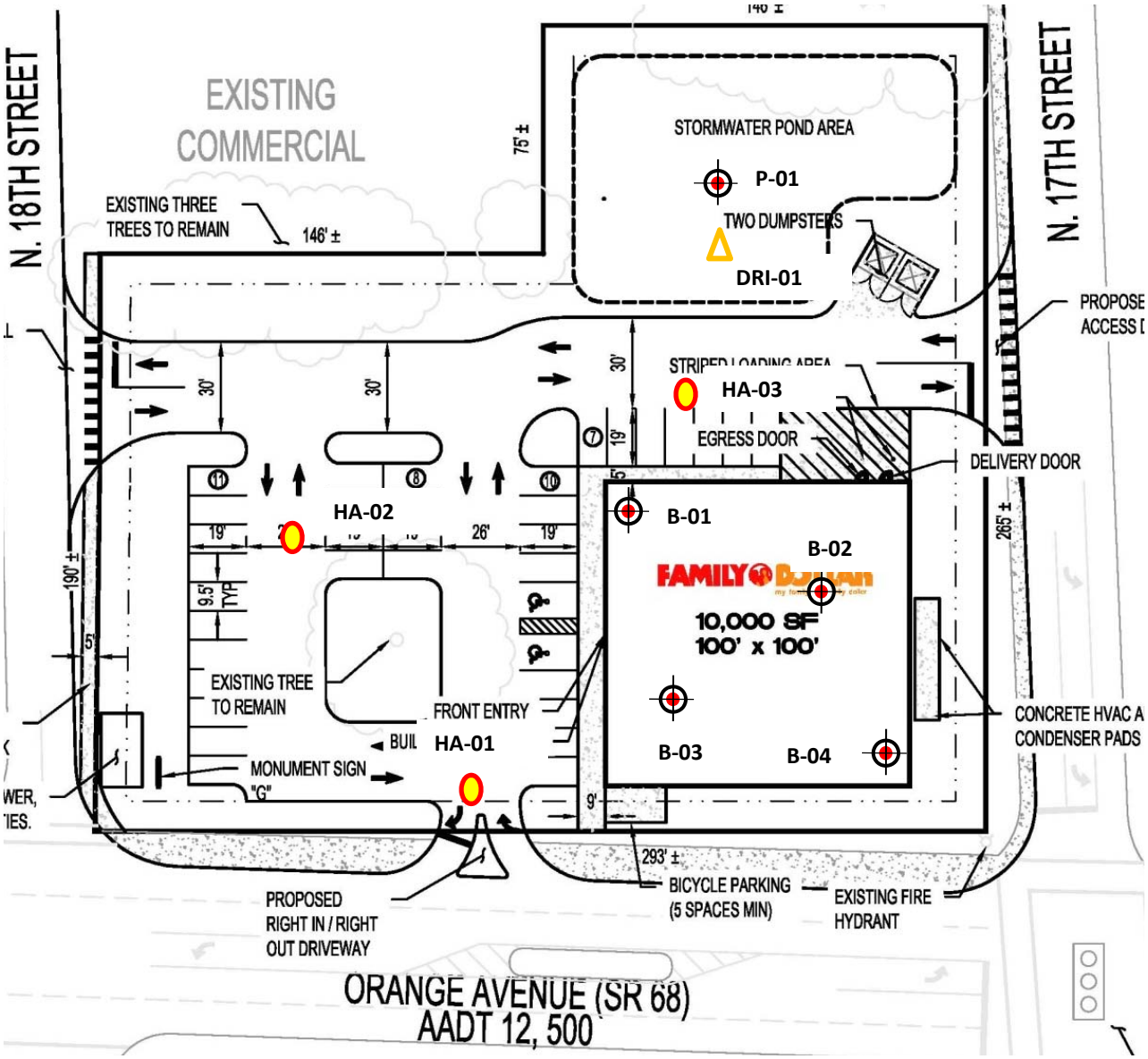
The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that conditions across a site will be different from those where the borings were drilled and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process itself may alter soil conditions. AREHNA is not responsible for the conclusions, opinions or recommendations made by others based on the data presented in this report.

APPENDIX A

Project Site Location Map – Figure 1
Field Exploration Plan – Figure 2
USGS Topographic Survey – Figure 3
USDA Soil Survey – Figure 4



Family Dollar Ft. Pierce, Florida	AREHNA | Engineering, Inc. 5012 West Lemon Street, Tampa, FL 33609 Phone 813.944.3464 ▪ Fax 813.944.4959	PROJECT SITE LOCATION MAP
Client: Blue Current Development Project: B-14-079 Date: July 7, 2014	Designed By: KSL Checked By: JEP Drawn By: KCA	FIGURE 1



LEGEND

- B-# - Standard Penetration Test Borings
- HA-# - Hand Auger Borings
- DRI-# - Double Ring Infiltration Test

N

Family Dollar
Ft. Pierce, Florida

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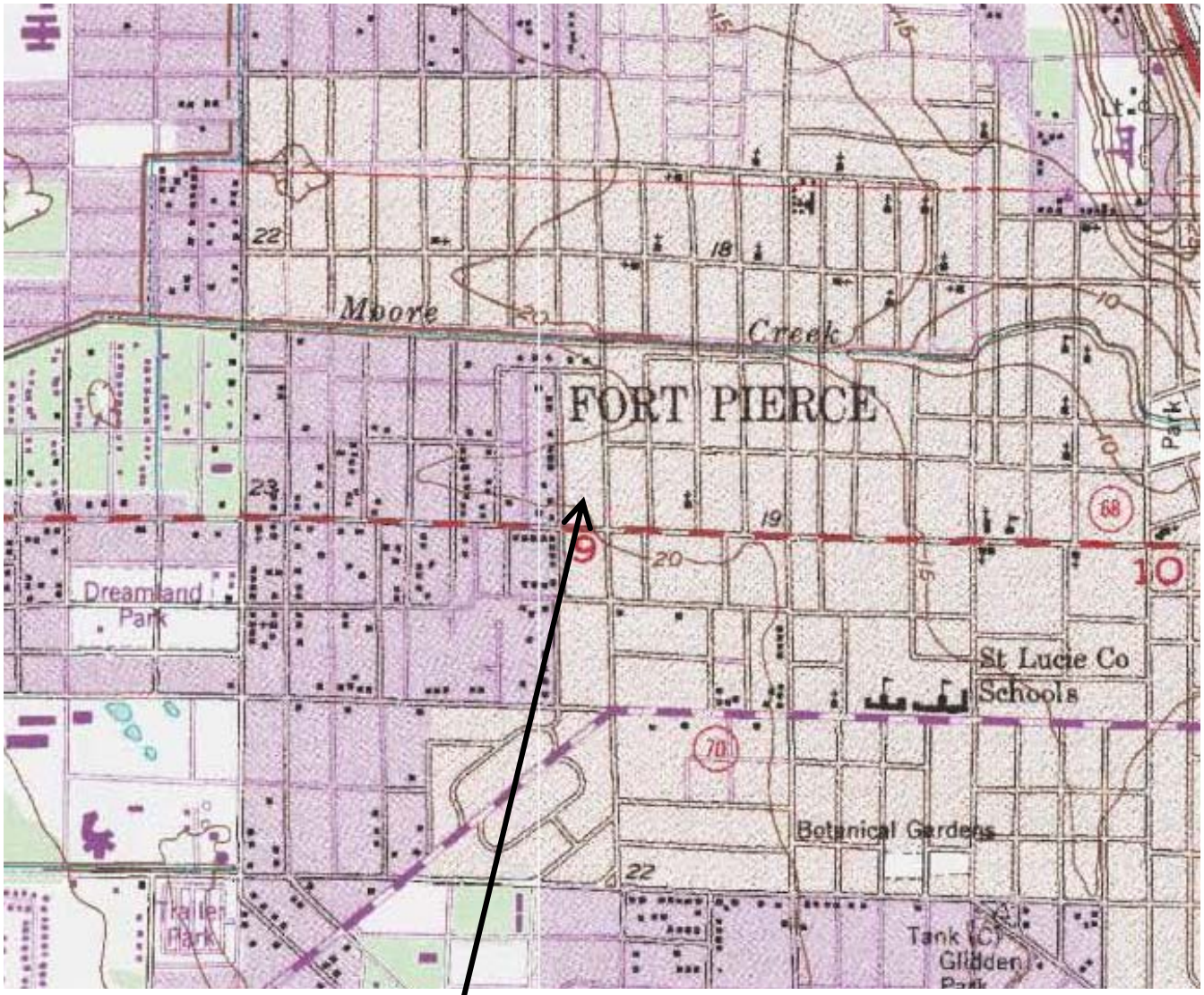
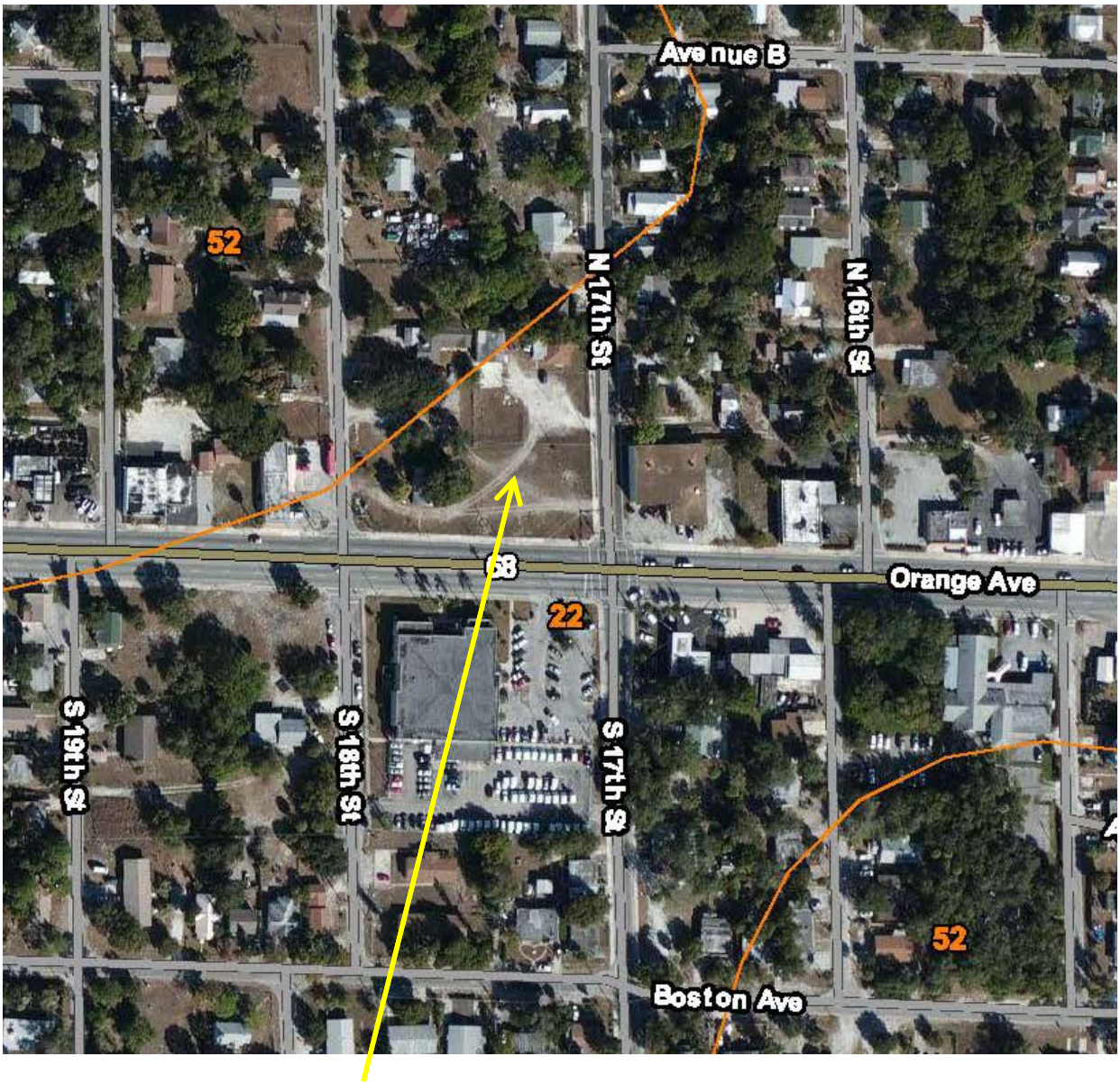
FIELD EXPLORATION LOCATION MAP

Designed By: KSL
Checked By: JEP
Drawn By: KCA

FIGURE 2



Family Dollar Ft. Pierce, Florida	AREHNA | Engineering, Inc. 5012 West Lemon Street, Tampa, FL 33609 Phone 813.944.3464 ▪ Fax 813.944.4959	USGS TOPOGRAPHIC SURVEY
Client: Blue Current Development Project: B-14-079 Date: July 7, 2014		Designed By: KSL Checked By: JEP Drawn By: KCA FIGURE 3



Project Site

Soil Mapping Unit
22 – Lawnwood – Urban land complex 52 – Waveland – Urban land complex

N

Family Dollar
Ft. Pierce, Florida

Client: Blue Current Development
Project: B-14-079
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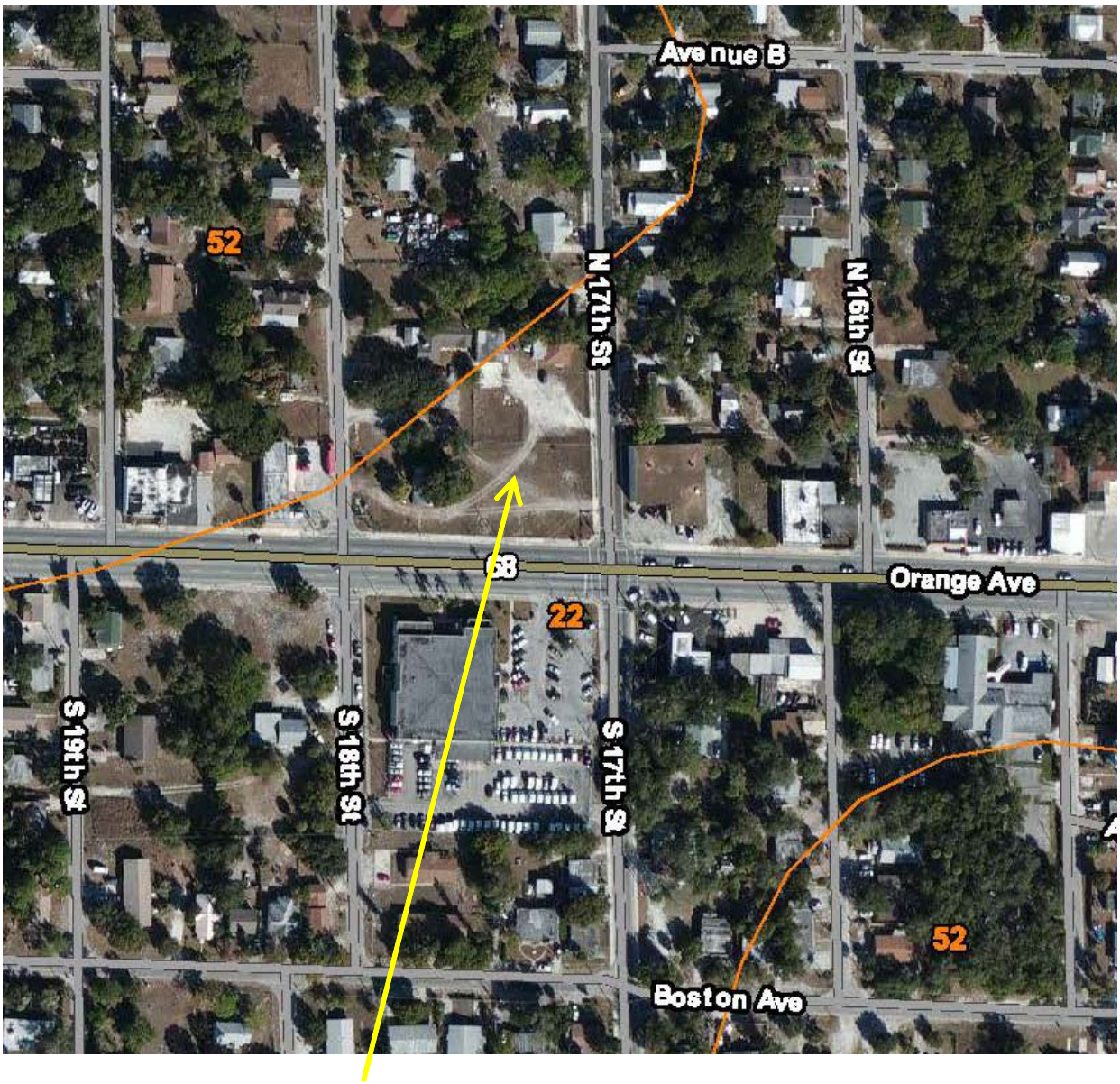
USDA SOIL SURVEY

Designed By: KSL
Checked By: JEP
Drawn By: KCA

FIGURE
4



Project Site

Soil Mapping Unit
22 – Lawnwood – Urban land complex 52 – Waveland – Urban land complex

N

Family Dollar
Ft. Pierce, Florida

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USDA SOIL SURVEY

Designed By: KSL
Checked By: JEP
Drawn By: KCA

FIGURE
4

APPENDIX B

Generalized Subsurface Profile – Figure 5
Soil Boring Records
Key to Classification Symbols
Double Ring Infiltration Test Results
Field Procedures

AREHNA | Engineering, Inc.
5012 West Lemon Street
Tampa, FL 33609

Date: 7/2/2014
Drawn By: LEF
Checked By: KL

Family Dollar

Ft. Pierce, FL

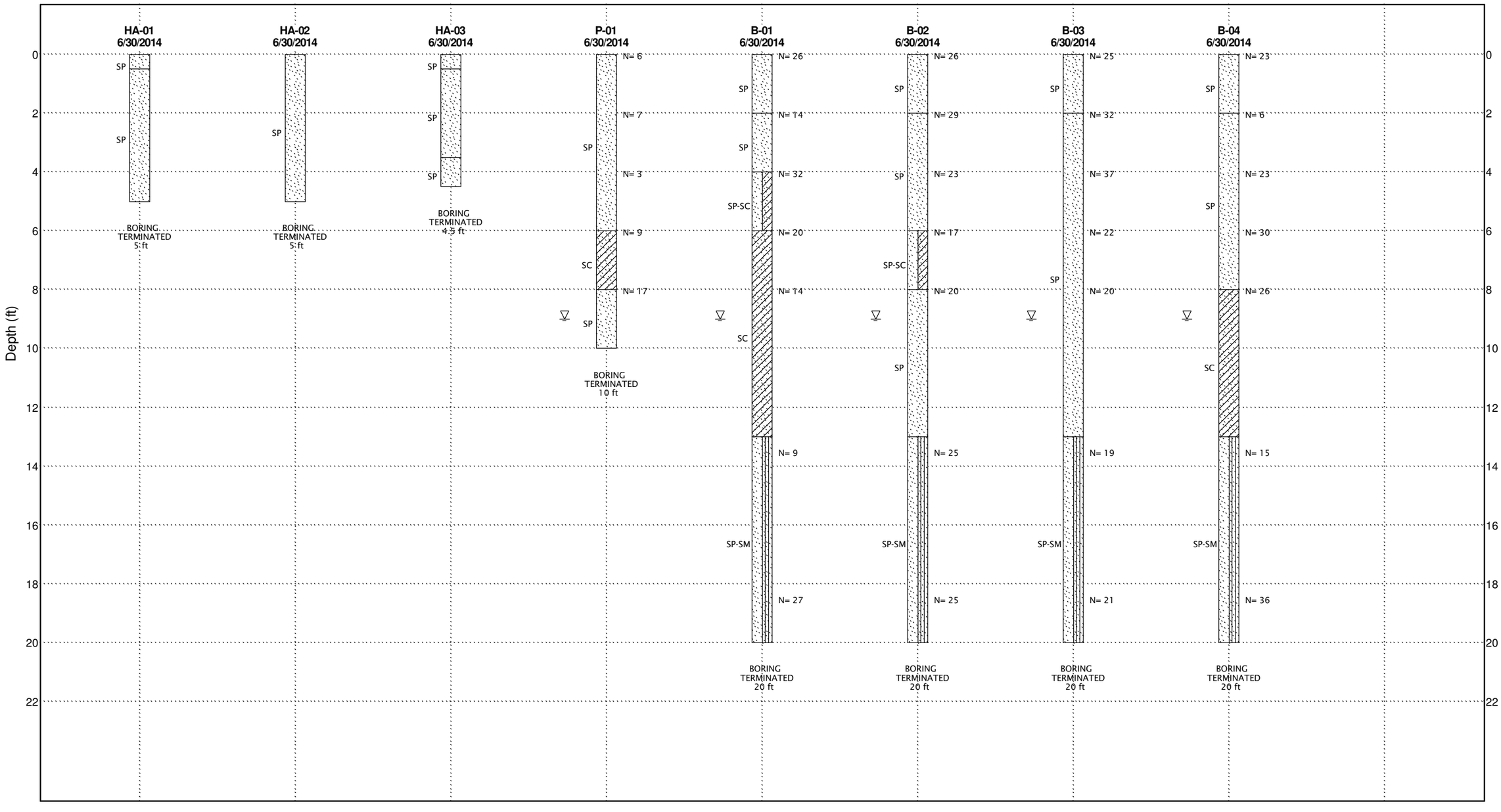
Prepared for
Blue Current Development

Project No.: B-14-079

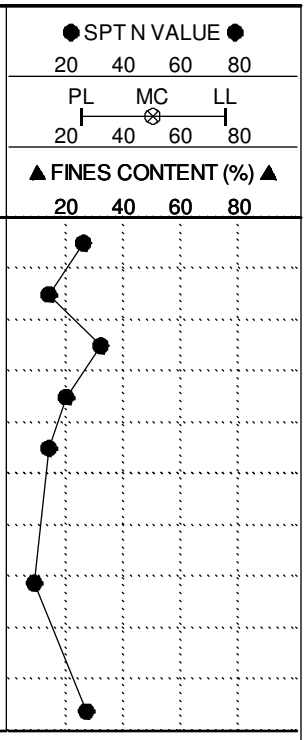
GENERALIZED SUBSURFACE PROFILE
Figure 5

Poorly-graded Sand
Poorly-graded Sand with Silt
Poorly-graded Sand with Clay
Clayey Sand

Soil Classification Key



DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE	SPT BLOW COUNTS	N-VALUE
0	Medium dense gray fine SAND (SP) with some rocks			SPT	3-12-14-9	26
	Medium dense light gray fine SAND (SP)			SPT	7-6-8-13	14
	Dense gray slightly clayey fine SAND (SP-SC)			SPT	11-14-18-18	32
	Medium dense gray clayey fine SAND (SC)			SPT	11-10-10-7	20
10		▽		SPT	8-7-7-8	14
	Loose to medium dense dark brown to brown slightly silty fine SAND (SP-SM)			SPT	6-4-5	9
20				SPT	9-12-15	27



Bottom of borehole at 20.0 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: ASTM D-1586, Standard Penetration Test Boring

Ground Water Level:

▽ At Time of Drilling: 9 ft below existing grade

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

SOIL BORING LOG

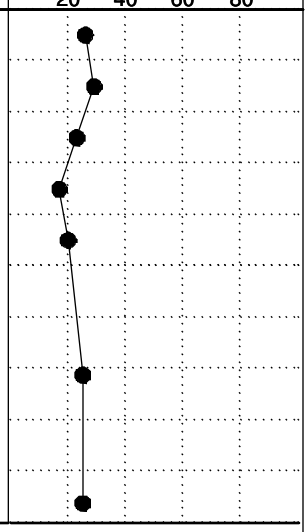
Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring B-01

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	SAMPLE TYPE	SPT BLOW COUNTS	N-VALUE
0	Medium dense dark gray fine SAND (SP) with some rocks	SPT	4-12-14-12	26
	Medium dense light gray fine SAND (SP)	SPT	10-13-16-19	29
		SPT	11-13-10-10	23
	Medium dense light brown slightly clayey fine SAND (SP-SC)	SPT	9-7-10-10	17
10	Medium dense light brown fine SAND (SP) ▽	SPT	10-10-10-10	20
	Medium dense dark brown slightly silty fine SAND (SP-SM)	SPT	10-11-14	25
20		SPT	7-10-15	25

WATER LEVEL / GRAPHIC LOG

SPT N VALUE
20 40 60 80
PL MC LL
20 40 60 80
▲ FINES CONTENT (%) ▲
20 40 60 80



Bottom of borehole at 20.0 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: ASTM D-1586, Standard Penetration Test Boring

Ground Water Level:

▽ At Time of Drilling: 9 ft below existing grade

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

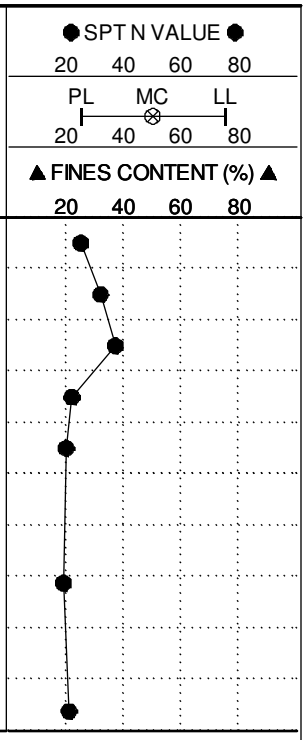
SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring B-02

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE	SPT BLOW COUNTS	N-VALUE
0	Medium dense light brown and gray fine SAND (SP) with shell fragments			SPT	7-12-13-11	25
	Medium dense to dense light gray to pale gray and brown fine SAND (SP)			SPT	8-18-14-24	32
				SPT	7-21-16-14	37
				SPT	14-11-11-10	22
10		▽		SPT	9-8-12-12	20
	Medium dense dark brown to brown slightly silty fine SAND (SP-SM)			SPT	9-9-10	19
20				SPT	10-10-11	21

Bottom of borehole at 20.0 feet.



Date Drilled: 6/30/14
Drilled By: AREHNA
Method: ASTM D-1586, Standard Penetration Test Boring

Ground Water Level:

▽ At Time of Drilling: 9 ft below existing grade

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

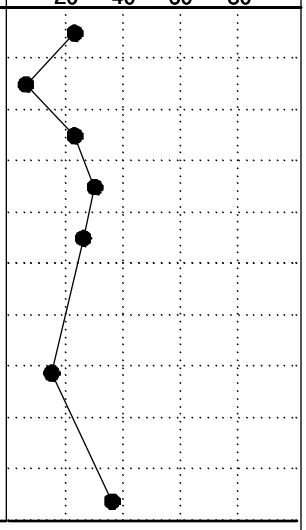
SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring B-03

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE	SPT BLOW COUNTS	N-VALUE
0	Medium dense gray fine SAND (SP) with some rock and shell fragments			SPT	13-14-9-6	23
	Loose to medium dense dark and light gray to light brown fine SAND (SP)			SPT	2-3-3-9	6
				SPT	11-11-12-15	23
				SPT	15-15-15-14	30
10	Medium dense brown clayey fine SAND (SC)	▽		SPT	11-11-15-13	26
	Medium dense to dense dark brown slightly silty fine SAND (SP-SM)			SPT	4-7-8	15
20				SPT	1-15-21	36

SPT N VALUE
20 40 60 80
PL MC LL
20 40 60 80
▲ FINES CONTENT (%) ▲
20 40 60 80



Bottom of borehole at 20.0 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: ASTM D-1586, Standard Penetration Test Boring

Ground Water Level:

▽ At Time of Drilling: 9 ft below existing grade

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

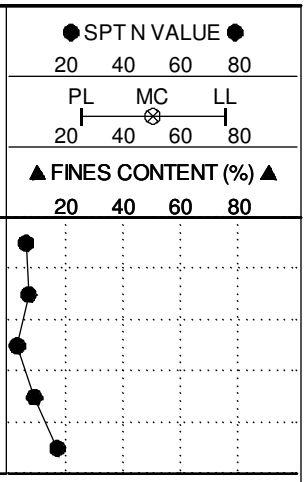
SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring B-04

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE	SPT BLOW COUNTS	N-VALUE
0	Very loose to loose gray to light brown fine SAND (SP)			SPT	3-3-3-3	6
				SPT	5-4-3-2	7
				SPT	2-1-2-2	3
	Loose gray clayey fine SAND (SC)			SPT	3-3-6-6	9
10	Medium dense light brown fine SAND (SP)	▽		SPT	8-7-10-8	17

Bottom of borehole at 10.0 feet.



Date Drilled: 6/30/14
Drilled By: AREHNA
Method: ASTM D-1586, Standard Penetration Test Boring

Ground Water Level:

▽ At Time of Drilling: 9 ft below existing grade

Remarks:

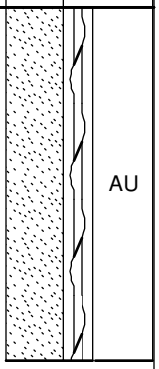
FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring P-01

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE
0	Gray fine SAND (SP) with some rocks			AU
	Gray to brown fine SAND (SP)			
5				

Bottom of borehole at 5.0 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: Auger Boring

Ground Water Level:
Groundwater not encountered

Remarks:

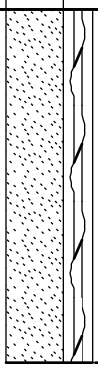
FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring HA-01

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE
0	Brown to light brown fine SAND (SP)			AU
5				

Bottom of borehole at 5.0 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: Auger Boring

Ground Water Level:
Groundwater not encountered

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring HA-02

DEPTH (ft)	SOIL DESCRIPTION AND REMARKS	WATER LEVEL	GRAPHIC LOG	SAMPLE TYPE
0	Pale brown fine SAND (SP) with some rocks and shell fragments			
	Gray to light gray fine SAND (SP)			AU
	Brown fine SAND (SP) with clay pockets			

Bottom of borehole at 4.5 feet.

Date Drilled: 6/30/14
Drilled By: AREHNA
Method: Auger Boring

Ground Water Level:
Groundwater not encountered

Remarks:

FAMILY DOLLAR
FT. PIERCE, FL
AREHNA Project No.: B-14-079
Blue Current Development

AREHNA | Engineering, Inc.

SOIL BORING LOG

Drawn By: LEF
Checked By: KL
Date: 7/2/2014

Boring HA-03

KEY TO SYMBOLS

AREHNA | Engineering, Inc.

CLIENT Blue Current Development **PROJECT NAME** Family Dollar

PROJECT NUMBER B-14-079 **PROJECT LOCATION** Ft. Pierce, FL

LITHOLOGIC SYMBOLS
(Unified Soil Classification System)


SP: Poorly-graded Sand


SP-SC: Poorly-graded Sand with Clay


SC: Clayey Sand


SP-SM: Poorly-graded Sand with Silt

SAMPLER SYMBOLS


Standard Penetration Test


Hand Auger

Standard Penetration Resistances

SAND & GRAVEL

No. of Blows	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
Greater than 50	Very Dense

SILT & CLAY

No. of Blows	Consistencey
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
Greater than 30	Hard

LIMESTONE

No. of Blows	Consistencey
10 - 20	Soft
21 - 50	Medium
51 - 50/3"	Hard
Greater than 50/3"	Very Hard

WOR = Weight of Rod
WOH = Weight of Hammer

Ground Water Level Measurements


Water Level at Time Drilling, or as Shown


Water Level After 24 Hours, or as Shown

ABBREVIATIONS

LL - LIQUID LIMIT (%)
PI - PLASTICITY INDEX (%)
W - MOISTURE CONTENT (%)
DD - DRY DENSITY (PCF)
NP - NON PLASTIC
-200 - PERCENT PASSING NO. 200 SIEVE
PP - POCKET PENETROMETER (TSF)

SOIL BOUNDARY CLASSIFICATIONS

FINE GRAINED SOILS | **COARSE GRAINED SOILS**

SILT or CLAY	SAND			GRAVEL		Cobbles	Boulders
	Fine	Medium	Coarse	Fine	Coarse		

200 Sieve | #40 Sieve | #10 Sieve | #4 Sieve | 3/4-inch | 3-inch | 12-inch

SUMMARY OF DOUBLE RING INFILTRATION TEST RESULTS

Family Dollar
Ft. Pierce, Florida

AREHNA Project No.: B-14-079

Test: **DRI-01**

Date of Test: July 7, 2014

Test Depth: 2.0 feet below ground surface

Test Procedure: ASTM D-3385

Outer Ring Diameter: 24 inches

Inner Ring Diameter: 12 inches

Head: 12.0 inches

Test Duration: 4 hrs

Time Increments (Minutes)	Infiltration per Time Period (Inches)
15	9
15	8.5
15	9
15	8
30	15
30	15

Infiltration Rate: 30 inches per hour

FIELD PROCEDURES

Standard Penetration Test (SPT) Borings

The SPT borings are performed in general accordance with ASTM D-1586, "Penetration Test and Split-Barrel Sampling of Soils." A rotary drilling process is used and bentonite drilling fluid is circulated in the boreholes to stabilize the sides and flush the cuttings. At regular intervals, the drilling tools are removed and soil samples are obtained with a standard 2-feet long, 2-inch diameter split-tube sampler. The sampler is first seated 6 inches and then driven an additional foot with blows of a 140-pound hammer falling under its own weight a distance of 30 inches. The number of hammer blows required to drive the sampler the final foot is designated the "Penetration Resistance." The penetration resistance, when properly interpreted, is an index to the soil strength and density.

Auger Boring

The auger borings are performed in general accordance with ASTM D-1452, “Standard Practice for Soil Investigation and Sampling by Auger Borings”. Auger borings are advanced manually using a bucket-type hand auger. The soils encountered are identified, in the field, from cuttings brought to the surface by the augering process. Representative soil samples from the auger borings are placed in glass jars and transported to our laboratory where they are examined by an engineer for classification.

Double Ring Infiltration (DRI) Testing

The DRI tests are performed in general accordance with ASTM D3385 “Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer”. The 24-inch diameter outer ring is set on the prepared and roughened surface and is driven into the soil to a depth of 6-inches. Care is taken not to disturb the soil adjacent to ring walls. The ring is then checked visually for levelness. The 12-inch diameter inner ring is then set concentrically within the outer ring and pushed and/or driven into the soil using methods described in the above paragraph to set the inner ring into the soil. The inner ring is then checked visually for level and location within the outer ring. Water is poured into both rings using a splash guard to reduce scouring of the soil surface during the testing. The inner ring and annular space is then simultaneously filled with water to a depth of 12 inches. Water is added during the testing to maintain the 12-inch depth and volume that is added during specific intervals is recorded. This water volume represents the volume infiltrated into the soils, and is converted to an infiltration velocity.