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SUPPLEMENTAL GEOTECHNICAL EXPLORATION

Maitland Concourse North – Master Stormwater
511 West Maitland Boulevard (SR 414)
Maitland, Orange County, Florida

UES Project No. 0130.1500104.0001
UES Report No. 1278329

PREPARED FOR:

RDMCN, LLC
315 South Biscayne Boulevard
Miami, Florida 33131

PREPARED BY:

Universal Engineering Sciences
3532 Maggie Boulevard
Orlando, Florida 32811
(407) 423-0504

October 27, 2015

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- West Palm Beach

October 27, 2015

RDMCN, LLC
315 South Biscayne Boulevard
Miami, Florida 33131

Attention: Mr. Max Cruz
mcruz@relatedgroup.com

Reference: Supplemental Geotechnical Exploration
Maitland Concourse North – Master Stormwater
511 West Maitland Boulevard (SR 414)
Maitland, Orange County, Florida
UES Project No. 0130.1500104.0001
UES Report No. 1278329

Dear Mr. Cruz:

As requested by Kimley-Horn & Associates, Inc. (Kimley-Horn), Universal Engineering Sciences, Inc. (Universal) has completed an additional geotechnical exploration at the referenced site in Orange County, Florida. The scope of our exploration was planned in conjunction with Kimley-Horn and authorized by you. This exploration was performed in accordance with generally accepted soil and foundation engineering practices. No other warranty, express or implied, is made.

PROJECT DESCRIPTION

We understand that the proposed project will include the construction of a new mixed-use (residential and commercial) development in Maitland, FL. Universal has previously performed geotechnical explorations at this project and submitted three (3) engineering reports (UES Reports No. 1222610, 1223626, and 1223755 dated April 28 and 30, 2015). Since the issuance of these reports, Kimley-Horn has requested additional borings and laboratory testing to aid in the stormwater design for the project.

FIELD METHODOLOGIES

As part of this additional exploration, three (3) SPT borings, designated ES-1 through ES-3 on the attached Boring Location Plan, were performed to a depth of 20 feet below existing land surface (bls). The SPT borings were performed in general accordance with the procedures of ASTM D 1586.

Horizontal and vertical survey control was not provided for the test locations prior to our field exploration program. Universal located the test borings by using the provided site plan, measuring from existing on-site landmarks shown on an aerial photograph, and by using handheld GPS devices. The indicated test locations should be considered accurate to the degree of the methodologies used. The approximate boring locations are shown in Appendix B.

LABORATORY TESTING

The soil samples recovered from the test borings were returned to our laboratory and visually classified in general accordance with ASTM D 2487 "Standard Classification of Soils for Engineering Purposes" (Unified Soil Classification System). We selected representative soil samples from the borings for laboratory testing to aid in classifying the soils and to help to evaluate the general engineering characteristics of the site soils. The results of these tests are shown on the boring logs. A summary of the tests performed is shown in Table I.

TABLE I
LABORATORY METHODOLOGIES

Test Performed	Number Performed	Reference
Grain Size Analysis (#200 wash only)	7	ASTM D 1140 "Amount of Material in Soils Finer than the No. 200 (75 - µm) sieve"
Moisture Content	7	ASTM D 2216 "Laboratory Determination of Water (Moisture) Content of Soil by Mass"
Permeability Test	6	ASTM D 2434 "Standard Test Method for Permeability of Granular Soils (Constant Head)"

SOIL PROFILES

The results of our additional exploration, together with pertinent information obtained from the SPT borings are shown on the attached boring logs in Appendix A. The soil profiles were prepared from the field logs after the recovered soil samples were examined by a Geotechnical Engineer.

The majority of the soils encountered at the boring locations consist mostly of very loose to medium dense fine sands [SP] to the maximum depth of drilling, 20 feet bls. Notable exceptions to the soil profile were a layer of silty-clayey fine sand [SC-SM] encountered at boring ES-2 from about 17½ to 20 feet. For more detailed soils profiles, see the attached boring logs.

GROUNDWATER CONDITIONS

We measured the water level in the boreholes after the completion of drilling on October 13, 2015. The encountered groundwater levels were measured at approximately 5 to 5½ feet bls at ES-2 and ES-3, respectively. No groundwater was encountered within the drilled depth at ES-1. The large variation in groundwater levels can be attributed to topographic relief across the site area. Fluctuations in groundwater levels should be anticipated throughout the year, primarily due to seasonal variations in rainfall, surface runoff, and other factors that may vary from the time the borings were conducted.

Based upon historical rainfall data, review of U.S.G.S. maps, NRCS Soils Survey, and site boring data, we estimate that the seasonal high groundwater level may form roughly 4 to 5 feet bls at borings ES-1 and ES-2, and below a depth of 15 feet at boring ES-1. The estimated seasonal high groundwater level at each boring is shown on the individual boring logs in Appendix A.

STORMWATER POND DESIGN PARAMETERS

The locations of the three (3) SPT borings were selected by Kimley-Horn. Our recommended stormwater management design parameters are shown in Table II.

TABLE II
STORMWATER MANAGEMENT DESIGN PARAMETERS

Design Parameter	Estimated Values		
Relevant Boring Logs	ES-1	ES-2	ES-3
Estimated Depth to Base of Surficial Aquifer (feet)	20+	17½	20+
Estimated Fillable Porosity of Surficial in-situ sands (percent)	25	25	25
Estimated Seasonal High Groundwater Level (feet)	>15	4	5
Estimated Horizontal Saturated Hydraulic Conductivity of Surficial Aquifer (feet per day)	24.0	12.5	25.5
Estimated Vertical Unsaturated Hydraulic Conductivity of Surficial Aquifer (feet per day)	16.0	8.3	17.0

Please note that survey control was not provided at our boring locations. The estimated depths in the above table are referenced to the existing ground surface at the time of our exploration. Appropriate factors of safety should be included in the design.

CLOSURE

We appreciate the opportunity to be working with you on this project and look forward to a continued association. Please note that all other provisions and recommendations listed in our previous reports, which were not changed in this supplemental report, still remain in effect. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Sincerely yours,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

Andrew S. Wilderotter, P.E.
Geotechnical Project Manager

Guy H. Rabens, M.S., P.E.
Geotechnical & Environmental Manager
Date: 10-27-15
Florida Registration No. 60917

GUY H. RABENS
LICENSE
No 60917
STATE OF FLORIDA
PROFESSIONAL ENGINEER

Distribution: Mr. Max Cruz (MCruz@relatedgroup.com)
Mr. Brent Lenzen, P.E. w/ Kimley-Horn (Brent.Lezen@kimley-horn.com)
Mr. Jonathan Martin, P.E. w/ Kimley-Horn (Jonathan.Martin@kimley-horn.com)

Appendices: Boring Plan and Logs

APPENDIX A

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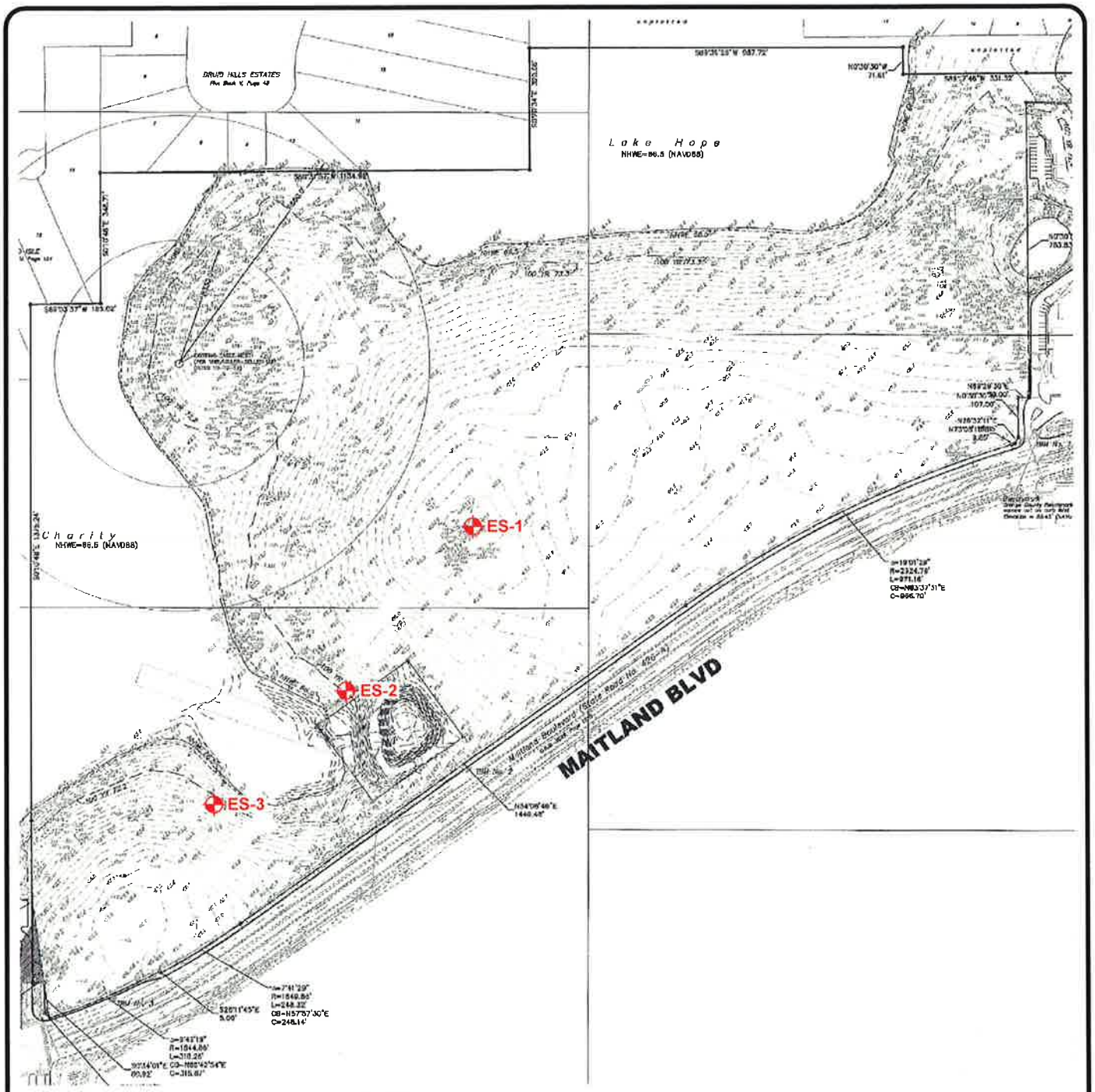

LEGEND

APPROX. STANDARD PENETRATION TEST BORING LOCATION (SPT)

BORINGS PERFORMED 10/13/15

0 400

SCALE (FT.)

N

THIS DRAWING CREATED USING PLAN PROVIDED BY CLIENT

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ADDITIONAL GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH - STORMWATER
MAITLAND AVENUE (S.R. 414)
MAITLAND, ORANGE COUNTY, FLORIDA

BORING LOCATION PLAN

DRAWN BY: R.K.S.	DATE: 10 - 13 - 15	CHECKED BY:	DATE:
SCALE: AS SHOWN	PROJECT NO: 0130.1500104.0001	REPORT NO:	PAGE NO: A-1

15-0417-01

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BORING LOG

PROJECT NO.:	0130.1500104.0001
REPORT NO.:	1278329
PAGE:	B-2.1

PROJECT: ADDITIONAL GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH - STORMWATER
MAITLAND, ORANGE COUNTY, FLORIDA

BORING I.D.: **ES-1** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 S RANGE: 29 E

CLIENT: RDMNC, LLC
LOCATION: SEE BORING LOCATION PLAN
REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

G.S. ELEVATION (ft): N.S. DATE STARTED: 10/13/15
WATER TABLE (ft): N.E. DATE FINISHED: 10/13/15
DATE OF READING: 10/13/15 DRILLED BY: ORL - DH/JC
EST. SHGWT (ft): >15 TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/DAY)	ORG. CONT. (%)
0						Loose brown fine SAND [SP]						
	X	3-3-2	5									
	X	3-2-2	4			-- very loose						
5	X	2-1-2	3				2	4			26	
	X	2-2-2	4			-- light brown						
	X	2-2-3	5			-- loose						
10	X	2-3-4	7				2	5			22	
						-- orange brown						
15	X	3-3-3	6									
	X	3-4-3	7			-- dark brown						
20						BORING TERMINATED AT 20.0 FT.						
25												

W-08849.GPJ

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0001
REPORT NO.:	1278329
PAGE:	B-2.2

PROJECT: ADDITIONAL GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH - STORMWATER
MAITLAND, ORANGE COUNTY, FLORIDA

BORING I.D.: **ES-2** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 S RANGE: 29 E

CLIENT: RDMNC, LLC
LOCATION: SEE BORING LOCATION PLAN
REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

G.S. ELEVATION (ft): N.S. DATE STARTED: 10/13/15
WATER TABLE (ft): 5.0 DATE FINISHED: 10/13/15
DATE OF READING: 10/13/15 DRILLED BY: ORL - DH/JC
EST. SHGWT (ft): 4 TYPE OF SAMPLING: ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/DAY)	ORG. CONT. (%)
0						Loose dark brown fine SAND [SP]						
		2-3-3	6			-- very loose, light brown						
		3-2-2	4	▽								
5		2-2-3	5	▼		-- loose, brown	5	20			14	
		3-4-5	9			-- light brown						
		3-4-6	10			-- medium dense, light gray brown						
10		4-5-7	12				5	20			11	
15		3-2-3	5			-- loose						
20		4-3-4	7			Loose light gray brown silty clayey fine SAND [SC-SM]	31	25				
						BORING TERMINATED AT 20.0 FT.						
25												

W-08849.GPJ

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	0130.1500104.0001
REPORT NO.:	1278329
PAGE:	B-2.3

PROJECT: ADDITIONAL GEOTECHNICAL EXPLORATION
MAITLAND CONCOURSE NORTH - STORMWATER
MAITLAND, ORANGE COUNTY, FLORIDA

BORING I.D.: **ES-3** SHEET: **1 of 1**
SECTION: 25 TOWNSHIP: 21 S RANGE: 29 E

CLIENT: RDMNC, LLC

LOCATION: SEE BORING LOCATION PLAN

REMARKS: SHGWT = SEASONAL HIGH GROUNDWATER TABLE, N.S. = NOT SURVEYED

G.S. ELEVATION (ft):	N.S.	DATE STARTED:	10/13/15
WATER TABLE (ft):	5.5	DATE FINISHED:	10/13/15
DATE OF READING:	10/13/15	DRILLED BY:	ORL - DH/JC
EST. SHGWT (ft):	5	TYPE OF SAMPLING:	ASTM D 1586

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N BLOWS / FT	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT/DAY)	ORG. CONT. (%)
0						Very loose dark brown fine SAND [SP]						
		2-2-2	4			-- brown						
		2-2-2	4			-- loose, light brown						
5		2-3-4	7	▽ ▼			2	11			24	
		2-3-3	6			-- shade lighter						
		2-2-3	5									
10		2-3-4	7				1	23			27	
						-- light gray brown						
15		4-4-6	10									
						-- medium dense						
20		6-8-11	19			BORING TERMINATED AT 20.0 FT.						
25												

W-08849.GPJ