DRAINAGE REPORT
FOR
IMC PROPERTY MANAGEMENT

KEY LARGO COMMERCIAL CENTER
101000 OVERSEAS HIGHWAY
LOCATED MILEMARKER 101
ALONG OVERSEAS HIGHWAY (US-1)

KEY LARGO, FLORIDA

CPH Job # I3604

Engineers
Planners
Landscape Architects
Surveyors
Construction Management
Design/Build

Certificate of Authorization No. 00003215

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HEIDI BELLE HENDERSON
LICENSE
No. 72304
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Heidi B Henderson, P.E.

PE Number 72304
P.E. Number

February 19, 2016
Date

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DRAINAGE REPORT

SECTION ONE: PROJECT INFORMATION

PROJECT NAME: Key Largo Commercial Center

OWNER OF PROJECT: IMC Property Management & Maintenance, Inc.

LOCATION: 101000 Overseas Highway (US-1)
Key Largo, FL 33037

SITE AREA: 3.31 acres

WATERSHED MANAGEMENT DISTRICT: South Florida Water Management District

EXISTING SITE CONDITIONS: 1 Story Retail Building

PROPOSED DEVELOPMENT: Partial demolition of 10,807 SF of existing building and construction of a 5,000 square foot (0.11 acre) retail store and a 3,116 square foot (0.07 acre) restaurant with drive through, including attached supporting parking lot, stormwater system, and utilities.

SECTION TWO: EXECUTIVE SUMMARY

A. Introduction
IMC is proposing a 5,000 square foot (0.11 acre) retail store and a 3,116 square foot (0.07 acre) restaurant with drive through located within the Unincorporated Monroe County at mile marker 101 along Overseas Highway and is located within Section 28, Township 61 South and Range 39 East.

B. Existing Stormwater Drainage Conditions
The existing lot was a 1 story building. There is no evidence of an existing drainage system onsite.

C. Stormwater Management System Design- Post Development Conditions
The site shall comply with the requirements of SFWMD and Monroe County. The proposed stormwater management system consists of inlets, pipes, exfiltration trench for pretreatment and water quality including an additional allowable volume equal to 3.28 inches over the site.

The exfiltration trench provides for 3.28 inches over the site which is equivalent to 0.90 ac-ft where the 0.40 ac-ft of standard water quality is met. The invert of the 18" storm

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pipe within the trench will be set at the estimated seasonal high water table of 1.5 ft, NAVD with the top of trench at elevation 5.85 ft, NAVD.

The following is the stage-storage for the pavement, open space, exfiltration trench,

PROPOSED STAGE-STORAGE CALCULATIONS				
Stage (ft)	Storage (ac-ft)			
	0.90 ac Exfil 1.5-5.85	1.68 ac Pvmt 7.85-10	1.21 ac Open 7.8-11	Total (ac-ft)
1.5	0.00	0.00	0.00	0.00
2	0.10	0.00	0.00	0.10
2.5	0.20	0.00	0.00	0.20
3	0.30	0.00	0.00	0.30
3.5	0.40	0.00	0.00	0.40
4	0.50	0.00	0.00	0.50
4.5	0.60	0.00	0.00	0.60
5	0.70	0.00	0.00	0.70
5.5	0.80	0.00	0.00	0.80
6	0.90	0.00	0.00	0.90
6.5	0.90	0.00	0.00	0.90
7	0.90	0.00	0.00	0.90
7.5	0.90	0.00	0.00	0.90
8	0.90	0.01	0.01	0.92
8.5	0.90	0.17	0.09	1.16
9	0.90	0.52	0.27	1.69
9.5	0.90	1.06	0.55	2.51
10	0.90	1.81	0.92	3.63

Results

A water quality volume of 0.40 ac-ft has been met within the trenches at elevation 3.5 ft, NAVD. The following are the peak stages for the design storms:

Cascade Results		
Design Storm Event	Precipitation (inches)	Max. Stage (ft, NAVD)
5 year - 1 day	6	8.07
25 year - 1 day	8	8.77
25 year - 3 day	11.8	9.45
100 year - 3 day	14	9.72

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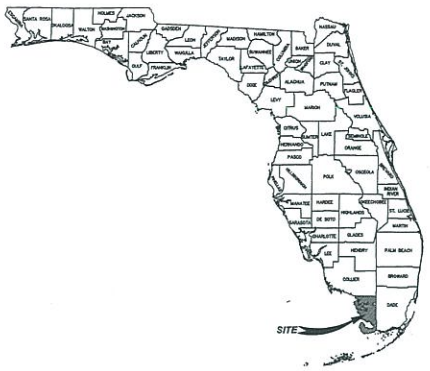
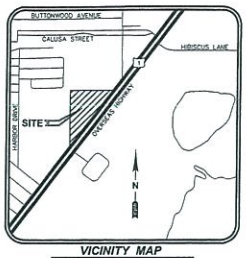
The lowest pavement elevation is 7.85 ft, NAVD which is lower than the 8.07 ft, NAVD from the model. The 25 year- 1 day storm event is kept onsite via back of curb and high points at the entrances no less than elevation 8.77 ft, NAVD. Thus, we have met Monroe County's and SFWMD stormwater criteria.

EXISTING SITE DATA								
Existing Project Area	=	144,155	sf	=	3.31	acres	=	100%
Total Impervious Area	=	144,155	sf	=	3.31	acres	=	100%
Building	=	20,239	sf	=	0.46	acres	=	14%
Pavement/ Sidewalk	=	123,916	sf	=	2.84	acres	=	86%
Total Pervious Area	=	0	sf	=	0.00	acres	=	0%
Open Space	=	0	sf	=	0.00	acres	=	0%
Dry Detention	=	0	sf	=	0.00	acres	=	0%

BOUNDARY & TOPOGRAPHIC SURVEY
ALSO BEING AN
(ALTA/ACSM LAND TITLE SURVEY)
FOR
IMC PROPERTY MANAGEMENT
AT
(OVERSEAS HIGHWAY - KEY LARGO)
LYING IN
SECTION 28-TOWNSHIP 61 SOUTH-RANGE 39 EAST
MONROE COUNTY, FLORIDA





VICINITY MAP
NOT TO SCALE

Legal Description: (PER OWNER'S POLICY NO. OF6-4078272)

THAT PORTION OF LOT 8 IN SECTION 28, TOWNSHIP 61 SOUTH, RANGE 39 EAST, ON KEY LARGO, ACCORDING TO MODEL LAND COMPANY'S PLAT BY P. F. JENKINS, CIVIL ENGINEER, RECORDED IN PLAT BOOK 1 AT PAGE 68, OF THE PUBLIC RECORDS OF MONROE COUNTY, FLORIDA, LYING NORTHWESTERLY OF STATE ROAD NO. 5 (U.S. NO. 1).

SAID PREMISES IS MORE PARTICULARLY DESCRIBED ON A CERTAIN SURVEY PREPARED AND CERTIFIED BY WALTER H. OKAHARA, P.L.S., DATED MARCH 3, 1977 UNDER JOB NO. 400-160.00 AND BASED ON A PREVIOUS BOUNDARY SURVEY PREPARED BY BAILEY AND POST CONSULTING ENGINEERS AND SURVEYORS, P.O. BOX 349, ISLAMORADA, FLORIDA 33036, UNDER JOB 887-73-0950 AND REVISED JUNE 4, 1974.

SAID PREMISES WAS FORMERLY DESCRIBED AS: ALL THAT PART OF LOT 8 IN SECTION 28, TOWNSHIP 61 SOUTH, RANGE 39 EAST, LYING NORTH OF THE RIGHT OF WAY OF THE FLORIDA EAST COAST RAILWAY COMPANY, ACCORDING TO THE SURVEY BY P.F. JENKINS AND PLAT THEREOF IN PLAT BOOK 1, PAGE 68, OF THE MONROE COUNTY, FLORIDA PUBLIC RECORDS. LESS THE COUNTY ROAD RIGHT OF WAY AS SHOWN ON SAID PLAT.

CONTAINING 144,160 SQUARE FEET OR 3.31 ACRES MORE OR LESS

OWNER'S POLICY - SCHEDULE B
PER OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY
POLICY NO. OF6-4078272
EFFECTIVE DATE MARCH 5, 2013 AT 3:52 P.M.

7. RESTRICTIONS, CONDITIONS, RESERVATIONS, EASEMENTS AND OTHER MATTERS CONTAINED ON THE PLAT AS RECORDED IN PLAT BOOK 1, PAGE(S) 68, PUBLIC RECORDS OF MONROE COUNTY, FLORIDA. (BLANKET IN NATURE – AFFECTS SUBJECT PARCEL)
8. OWNER'S ACKNOWLEDGEMENT OF FIRE WELL RESTRICTIONS RECORDED IN OFFICIAL RECORDS BOOK 1148, PAGE 77, PUBLIC RECORDS OF MONROE COUNTY, FLORIDA. (AS TO FIRE WELLS SHOWN ON BOUNDARY – AFFECTS SUBJECT PARCEL)
9. RIGHTS OF THE LESSEES UNDER UNRECORDED LEASES.
10. MORTGAGE, ASSIGNMENT OF LEASES AND RENTS AND SECURITY AGREEMENT EXECUTED BY KEY LARGO TREE, LLC, A FLORIDA LIMITED LIABILITY COMPANY IN FAVOR OF FIRST BANK OF MIAMI, A FLORIDA BANKING CORPORATION, DATED FEBRUARY 27, 2013 AND RECORDED MARCH 5TH, 2013 IN O.R. BOOK 2616, PAGE 1473, PUBLIC RECORDS OF MONROE COUNTY, FLORIDA, IN THE ORIGINAL PRINCIPAL AMOUNT OF $1,500,000.00. (LEASE AGREEMENT – AFFECTS SUBJECT PARCEL)
11. UCC- 1 FINANCING STATEMENT RECORDED MARCH 5TH, 2013 IN O.R. BOOK 2616, PAGE 1462, PUBLIC RECORDS OF MONROE COUNTY, FLORIDA.

Survey Notes:

1. "SURVEY MAP AND REPORT OR THE COPIES THEREOF ARE NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER."
2. "ADDITIONS OR DELETIONS TO SURVEY MAPS OR REPORTS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES."
3. ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD '88) AND MATCHED TO FDOT BENCHMARK #PNC 101.0 PROVIDED BY FDOT FINANCIAL PROJECT ID NO. 419846-2-52-01 DATED 4/8/13 HAVING AN ELEVATION OF 10.32.
   SITE BENCHMARKS ARE AS SHOWN ON SHEET 3 OF 3.
4. THIS SURVEY IS NOT VALID WITHOUT SHEETS 1 THROUGH 3 OF 3.
5. THE LAST DAY FIELD WORK WAS PERFORMED WAS 3/25/15; ALL BOUNDARY CORNERS WERE RECOVERED OR SET AS NOTED HEREON.
6. THE "LEGAL DESCRIPTION" HEREON IS PER OWNER'S POLICY NO. OF6-4078272, AND WAS PROVIDED BY THE CLIENT.
7. BEARINGS SHOWN HEREON ARE RELATIVE TO THE NORTHWESTERLY RIGHT-OF-WAY LINE OF STATE ROAD NO. 5 (U.S. 1) PER ALTA/ACSM BOUNDARY SURVEY PREPARED BY McVAY-WOOD & ASSOCIATES, INC DATED 2/7/03 AS BEING N 37°22'34" E AS SHOWN ON SAID BOUNDARY SURVEY.
8. HAVING CONSULTED THE NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NO. 12512I-0031-K MAP REVISED DATE FEBRUARY 18, 2005, THE SUBJECT PROPERTY APPEARS TO LIE IN ZONE X, WHICH ARE AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN AND LIES IN ZONE X (SHADED), WHICH ARE AREAS OF 0.2% ANNUAL CHANCE FLOOD, AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD. THIS DETERMINATION WAS BASED ON A GRAPHIC INTERPOLATION OF SAID MAP AND NOT ON ACTUAL FIELD MEASUREMENTS.
9. THE APPARENT USE OF THE LAND, AS CLASSIFIED BY THE STANDARDS OF PRACTICE RULE CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODE ESTABLISHES THAT THE MINIMUM RELATIVE ACCURACY FOR THIS TYPE OF BOUNDARY SURVEY MEET THE HORIZONTAL CONTROL ACCURACY OF 1':10,000 FEET FOR A HIGH RISK SURVEY. THE MEASUREMENTS AND CALCULATIONS OF THE CLOSED GEOMETRIC FIGURES WERE FOUND TO MEET THIS ACCURACY REQUIREMENT. THE EQUIPMENT USED TO VERIFY THE HORIZONTAL CONTROL ON THE SUBJECT SURVEY WAS A TOPCON GPS HIPER V.
10. HORIZONTAL WELL-IDENTIFIED FEATURES IN THIS SURVEY AND MAP HAVE BEEN MEASURED TO AN ESTIMATED HORIZONTAL POSITIONAL ACCURACY OF 0.05 (FT). THE EQUIPMENT USED TO LOCATE THE FEATURES WAS A LEICA SCANSTATION C10, TOPCON PS-103A ROBOTIC TOTAL STATION AND A TOPCON GPS HIPER V.
11. UNLESS OTHERWISE NOTED, ALL RECORD INFORMATION SHOWN HEREON IS BASED ON INFORMATION CONTAINED IN THE OWNER'S POLICY BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY, POLICY NO. OF6-4078272, EFFECTIVE DATE MARCH 5, 2013 AT 3:52 P.M. AND WAS PROVIDED BY THE CLIENT.
12. NO UNDERGROUND UTILITIES, FOUNDATIONS OR IMPROVEMENTS, IF ANY, HAVE BEEN LOCATED EXCEPT AS SHOWN.
13. THIS SURVEY DOES NOT IDENTIFY THE LIMITS OR EXTENT OF POTENTIAL JURISDICTIONAL WETLAND BOUNDARIES.
14. FENCES EXISTING ON, OVER OR ADJACENT TO SUBJECT PROPERTY, ARE DISPLAYED HEREON; OWNERSHIP WHETHER SINGULAR OR JOINT WAS NOT DETERMINED BY THIS SURVEY.
15. VERTICAL FEATURE ACCURACY: "ELEVATIONS OF WELL-IDENTIFIED FEATURES CONTAINED IN THIS SURVEY AND MAP HAVE BEEN MEASURED TO AN ESTIMATED VERTICAL POSITIONAL ACCURACY OF 0.05 (FT)."
16. DIMENSIONS ARE SHOWN RELATIVE TO UNITED STATES STANDARD FEET AND DECIMALS THEREOF, UNLESS THE OBJECT SHOWN IS COMMONLY IDENTIFIED IN INCHES, I.E. TREE DIAMETER, PIPE DIAMETER, ETC. TREES DEPICTED ARE COMMON NAMES AND MEASURED AND LABELED AS DIAMETER AT BREAST HEIGHT IN INCHES.
17. THE UNDERGROUND UTILITIES DEPICTED BY PIPE LINETYPES ARE APPROXIMATE IN NATURE BASED UPON AN INSPECTION OF THE MANHOLE, GRATE, ETC. OF EACH FACILITY. EXISTING PIPES WERE NOT LAMPED OR REMOTELY VIEWED FOR OBSTRUCTIONS OR CONNECTIVITY.

Abbreviation Legend:

(A)	– ACTUAL	MES	– MITERED END SECTION
A/C	– AIR CONDITIONER	MH	– MANHOLE
ACSM	– AMERICAN CONGRESS ON SURVEYING & MAPPING	MLP	– METAL LIGHT POLE
ADA	– AMERICANS WITH DISABILITIES ACT	MPH	– MILES PER HOUR
ALTA	– AMERICAN LAND TITLE ASSOCIATION	MPP	– METAL POWER POLE
APPROX	– APPROXIMATE	N/A	– NOT APPLICABLE
ARV	– AIR RELEASE VALVE	NAVD	– NORTH AMERICAN VERTICAL DATUM
AVE	– AVENUE	NAD	– NORTH AMERICAN DATUM
AVG	– AVERAGE	NG	– NATURAL GROUND
(BB)	– BEARING BASIS	NGS	– NATIONAL GEODETIC SURVEY
BFP	– BACK FLOW PREVENTER	NGVD	– NATIONAL GEODETIC VERTICAL DATUM
BLK	– BLOCK	N & D	– NAIL AND DISK
BLDG	– BUILDING	NO.	– NUMBER
BLVD	– BOULEVARD	NR	– NON-RADIAL
BM	– BENCH MARK	NSPS	– NATIONAL SOCIETY OF PROFESSIONAL SURVEYORS
BOC	– BACK OF CURB		
BOW	– BACK OF WALK	NT	– NON-TANGENT
BSL	– BUILDING SETBACK LINE	NTS	– NOT TO SCALE
BWF	– BARBED WIRE FENCE	OD	– OUTSIDE DIAMETER
C-X	– DENOTES SHEET NUMBERING FOR ENGINEERING PLANS	ORB	– OFFICIAL RECORDS BOOK
(C)	– CALCULATED	OR	– OFFICIAL RECORDS
C	– CHORD	OUL	– OVERHEAD UTILITY LINES
CATV	– CABLE TELEVISION RISER	OTL	– OVERHEAD TRAFFIC LINES
CB	– CHORD BEARING	(P)	– PLAT
CBS	– CONCRETE BLOCK STRUCTURE	PB	– PLAT BOOK
C.C.R.	– CERTIFIED CORNER RECORD	PC	– POINT OF CURVATURE
C&G	– CURB & GUTTER	PCC	– POINT OF COMPOUND CURVATURE
CI	– CATCH INLET	PCP	– PERMANENT CONTROL POINT
C/L	– CENTERLINE	PFF	– PROPOSED FINISHED FLOOR
CLF	– CHAIN LINK FENCE	PG	– PAGE
CM	– CONCRETE MONUMENT	PGS	– PAGES
CMP	– CORRUGATED METAL PIPE	PI	– POINT OF INTERSECTION
CO	– CLEANOUT	PK	– PARKER KALYON
CONC	– CONCRETE	POB	– POINT OF BEGINNING
COR	– CORNER	POC	– POINT OF COMMENCEMENT
CRPP	– CORRUGATED PLASTIC PIPE	POL	– POINT ON LINE
CUE	– COUNTY UTILITY EASEMENT	PP	– POWER POLE
CWS	– CROSSWALK SIGNAL	PRC	– POINT OF REVERSE CURVATURE
Δ	– DELTA	PRM	– PERMANENT REFERENCE MONUMENT
(D)	– DESCRIPTION	PSM	– PROFESSIONAL SURVEYOR & MAPPER
DB	– DEED BOOK	PT	– POINT OF TANGENCY
DBH	– DIAMETER AT BREAST HEIGHT IN INCHES	PVC	– POLYVINYL CHLORIDE PIPE
DE	– DRAINAGE EASEMENT	PVMT	– PAVEMENT
DEPT	– DEPARTMENT	R39E	– RANGE 39 EAST
DIP	– DUCTILE IRON PIPE	R	– RADIUS
DR	– DRIVE	RAD	– RADIAL
D/U	– DRAINAGE AND UTILITY EASEMENT	RCP	– REINFORCED CONCRETE PIPE
(E)	– ENGINEERING PLAN	REC	– RECOVERED
EJB	– ELECTRIC JUNCTION BOX	REV	– REVISION
EL	– UNDERGROUND ELECTRICAL LINES	RP	– RADIUS POINT
ELEC	– ELECTRIC	R/W	– RIGHT-OF-WAY
ELEV	– ELEVATION	RLS	– REGISTERED LAND SURVEYOR
ELLIP	– ELLIPTICAL	RP	– RADIUS POINT
EO	– END OF INFORMATION	RWL	– UNDERGROUND RECLAIM WATER LINE
EOP	– EDGE OF PAVEMENT	RWM	– RECLAIMED WATER METER
FB	– FIELD BOOK	SE	– SPECIAL EASEMENT
FDOT	– FLORIDA DEPARTMENT OF TRANSPORTATION	SEC 28	– SECTION 28
FF	– FINISH FLOOR	SMH	– SANITARY SEWER MANHOLE
FG	– FLAT GRATE INLET	(SP)	– STATE PLANE
FGLP	– FIBERGLASS LIGHT POLE	SQ	– SQUARE
FHYD	– FIRE HYDRANT	SQ FT	– SQUARE FEET
FM	– FORCE MAIN	ST	– STREET
FND	– FOUND	STMH	– STORM DRAINAGE MANHOLE
FP&L	– FLORIDA POWER AND LIGHT	S/W	– SIDEWALK
(G)	– GRID (STATE PLANE)	TB	– TANGENT BEARING
GC	– UNDERGROUND GAS LINES	TR15	– TOWNSHIP 61 SOUTH
GOV'T	– GOVERNMENT	TELE	– TELEPHONE
GPR	– GROUND PENETRATING RADAR	TL	– OVERHEAD TRAFFIC SIGNAL LINES
GTMH	– GREASE TRAP MANHOLE	TOB	– TOP OF BANK
HDPE	– HIGH DENSITY POLYETHYLENE PIPE	TOE	– TOE OF SLOPE
HWF	– HOG WIRE FENCE	TR	– TELEPHONE RISER
ID	– IDENTIFICATION	TRANS	– TRANSFORMER PAD
ICV	– IRRIGATION CONTROL VALVE	TSB	– TRAFFIC SIGNAL BOX
INFO	– INFORMATION	TSSP	– TRAFFIC SIGNAL SUPPORT POLE
INV	– INVERT	TV	– UNDERGROUND CABLE TV LINES
IP	– IRON PIPE	(TYP)	– TYPICAL
IP&C	– IRON PIPE & CAP	UE	– UTILITY EASEMENT
IR	– IRON ROD	UNK	– UNKNOWN
IR&C	– IRON REBAR & CAP	UTL	– UNDERGROUND TELEPHONE LINES
IRR	– IRRIGATION	W/	– WITH
L	– ARC LENGTH	WL	– UNDERGROUND WATER LINE
LBB	– LICENSED BUSINESS NUMBER	WLP	– WOOD LIGHT POLE
LP	– LIGHT POLE	WM	– WATER METER
(M)	– MEASURED	WP	– WORK PROGRAM
MB	– MAP BOOK	WPF	– WOOD POST FENCE
MBX	– MAILBOX	WPP	– WOOD POWER POLE
		WV	– WATER VALVE

Line Legend:
NOT TO SCALE

- = 1 FOOT CONTOURS
- = 5 FOOT CONTOURS
- = ADJOINER PROPERTY LINES
- = BARBED WIRE FENCE
- = BROKEN LINE
- = BURIED CABLE
- = BURIED CABLE TELEVISION
- = BURIED ELECTRIC
- = BURIED FIBER OPTICS
- = BURIED GAS
- = BURIED RECLAIMED WATER LINE
- = BURIED SANITARY LINES
- = BURIED SANITARY SEWER FORCE MAIN LINE
- = BURIED TRAFFIC CONTROL
- = BURIED TELEPHONE LINE
- = BURIED WATER LINES
- = CENTER LINE R/W
- = CHAIN LINK FENCE
- = EASEMENT LINES (EXISTING)
- = EASEMENT LINES (PROPOSED)
- = EDGE OF WATER LINES
- = EXISTING DRAINAGE PIPES
- = EXISTING DRAINAGE PIPES (OUTFALL NOT LOCATED)
- = FIRE WATER MAIN LINES
- = HOT WATER SUPPLY LINES
- = IRRIGATION LINES
- = OVERHEAD TRAFFIC LINES
- = OVERHEAD UTILITY LINES
- = RAILROAD TRACKS
- = RIGHT-OF-WAY LINES
- = SECTION LINES
- = STONE WALL LINES
- = TOP OF BANK LINES
- = TOE OF SLOPE LINES
- = TREE LINES
- = TRAVERSE LINES
- = UNKNOWN BURIED LINES
- = SILT FENCE
- = WOOD FENCE
- = WETLAND LINE

Symbol Legend:
NOT TO SCALE

- AIR RELEASE VALVE
- BORING HOLE LOCATION
- BRICK PAVERS
- CABLE TV RISER
- CENTRAL ANGLE
- CONCRETE
- CLEAN OUT
- CONCRETE MITERED END SECTION
- CONCRETE RIP RAP
- CONCRETE UTILITY POLE
- COUNTY ROAD SYMBOL
- DUAL SUPPORT SIGN
- ELECTRICAL MANHOLE
- ELECTRICAL JUNCTION BOX
- ELECTRIC OUTLET
- ELECTRIC RISER
- FIRE HYDRANT
- FLOOD LIGHT
- FOUND CONCRETE MONUMENT (AS NOTED)
- FOUND IRON PIPE (AS NOTED)
- FOUND IRON REBAR (AS NOTED)
- FOUND/SET NAIL (AS NOTED)
- GARBAGE CAN
- GAS VALVE
- GOPHER TORTOISE HOLE
- GRATE INLET
- GREASE TRAP MANHOLE
- GUY ANCHOR
- HANDICAP PARKING SPACE
- INTERSTATE SYMBOL
- IRRIGATION CONTROL VALVE
- CONCRETE LIGHT POLE
- LIGHT POLE
- LIGHT POLE (DUAL)
- LIGHT POLE (TRIPLE)
- LIGHT POLE (QUAD)
- MAILBOX
- MONITOR WELLS
- NAIL & DISC (AS NOTED)
- PULL BOX (AS NOTED)
- PARKING SPACES (2)
- REVISION NUMBER (3)
- RECLAIMED WATER METER
- RECLAIMED WATER VALVE
- ROOF DRAIN
- SANITARY SEWER MANHOLE
- SANITARY SEWER VALVE
- SCHEDULE B ITEM NUMBER (8)
- GROUND LIGHT
- SECTION CORNER
- 4" X 4" CM LB #7143
- 5/8" IR&C LB #7143
- SIGN
- SITE BENCH MARK
- STORM SEWER MANHOLE
- STRIPING (DIRECTIONAL)
- TELEPHONIC CABLE RISER
- TELEPHONIC MANHOLE
- TELEPHONE JUNCTION BOX
- TEST HOLE
- TRAFFIC SIGNAL BOX
- TRAFFIC SIGNAL SUPPORT POLE
- WATER METER
- WATER SERVICE
- WATER SPIGOT
- WATER SPRINKLER
- WATER VALVE
- WELL
- WETLAND FLAG
- WOOD UTILITY POLE
- UNKNOWN MANHOLE
- CONCRETE PAVERS
- DETECTABLE WARNING AREA
- CONCRETE LIGHT POLE (DUAL)
- CONCRETE LIGHT POLE (TRIPLE)
- CONCRETE LIGHT POLE (QUAD)
- UNKNOWN RISER

NOTE: VENT (AS NOTED) WIRE HEIGHTS (SEE CHART) CROSSWALK SIGNAL POLE

Sign Legend:
NOT TO SCALE

(R1)	ROW NUMBER SIGN
(B)	BUS STOP SIGN
(DE)	DEAD END SIGN
(DNE)	DO NOT ENTER SIGN (R5-1)
(HC)	HANDICAP SIGN
(KR)	KEEP RIGHT SIGN
(LTO)	LEFT TURN ONLY
(ME)	MEDIAN SIGN
(ND)	NO DUMPING SIGN
(NL)	NO LEFT TURN SIGN (R3-2)
(NU)	NO U-TTERING SIGN
(FL)	NO PARKING FIRE LANE SIGN
(NOR)	NO RIGHT TURN SIGN (R3-1)
(NOT)	NO TRUCKS (R5-2)
(NP)	NO PARKING SIGN
(1W)	ONE WAY SIGN (R6-2)
(PE)	PEDESTRIAN CROSSING SIGN
(RTO)	RIGHT TURN ONLY
(SL)	SPEED LIMIT SIGN
(ST)	STOP SIGN (R1-1)
(SS)	STREET SIGN
(TZ)	TOW AWAY ZONE SIGN
(TE)	TRUCK ENTRANCE SIGN
(U)	UNKNOWN SIGN
(WL)	WEIGHT LIMIT SIGN
(WW)	WRONG WAY SIGN
(Y)	YELD SIGN

THIS SURVEY IS NOT VALID WITHOUT SHEETS 1 THROUGH 3 OF 3.

Reference Material

1) FDOT MAP SECTION 90060 DATED 03-02.
2) ALTA/ACSM BOUNDARY SURVEY PREPARED BY McVAY-WOOD & ASSOCIATES, INC DATED 2/7/03.
3) MODEL LAND COMPANY, PLAT PB 1, PG 68 (4 PAGES).

TITLE BLOCK ABBREVIATIONS
Esq. = ENGINEERING LBA = LICENSED BUSINESS
C.O.A. = CERTIFICATE OF AUTHORIZATION AAC = ARCHITECTURAL
License #, LANDSCAPE NIA = NOT APPLICABLE LA. = LICENSED
No. = NUMBER P.O. = POST OFFICE ©= COPYRIGHT

Index of Sheets

Surveyor's Certification:

Certified to: KEY LARGO TREE, LLC, A FLORIDA LIMITED LIABILITY COMPANY

This is to certify that this map or plat and the survey which it is based were made in accordance with the 2011 Minimum Standard Detail Requirements for ALTA/ACSM Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1-5, 6(b), 7(a), 7(b)(1), 7(c), 8, 9, 11(a), 13-16, 18 and 19 of Table A thereof. The field work was completed on March 25, 2015.

Also

I hereby certify that the attached "ALTA/ACSM Land Title Survey" of the hereon-described property is true and correct to the best of my knowledge, information and belief as surveyed in the field on March 25, 2015. I further certify that this "Boundary & Topographic Survey" meets the standards of practice set forth in Rule Chapter 5J-17 of the Florida Administrative Code, pursuant to FS 472.027.

For the Firm By: _____
Thomas J. Galloway
Professional Surveyor and Mapper
Florida Registration No. 6549

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No.	Date	Revision	By

Field Crew: L.S.
Drawn by: J.A.B.
Checked by: R.L.R.
Approved by: T.J.G.
Scale: N/A
Date: 3/25/15
Job No.: I3664
File: I3664.dwg
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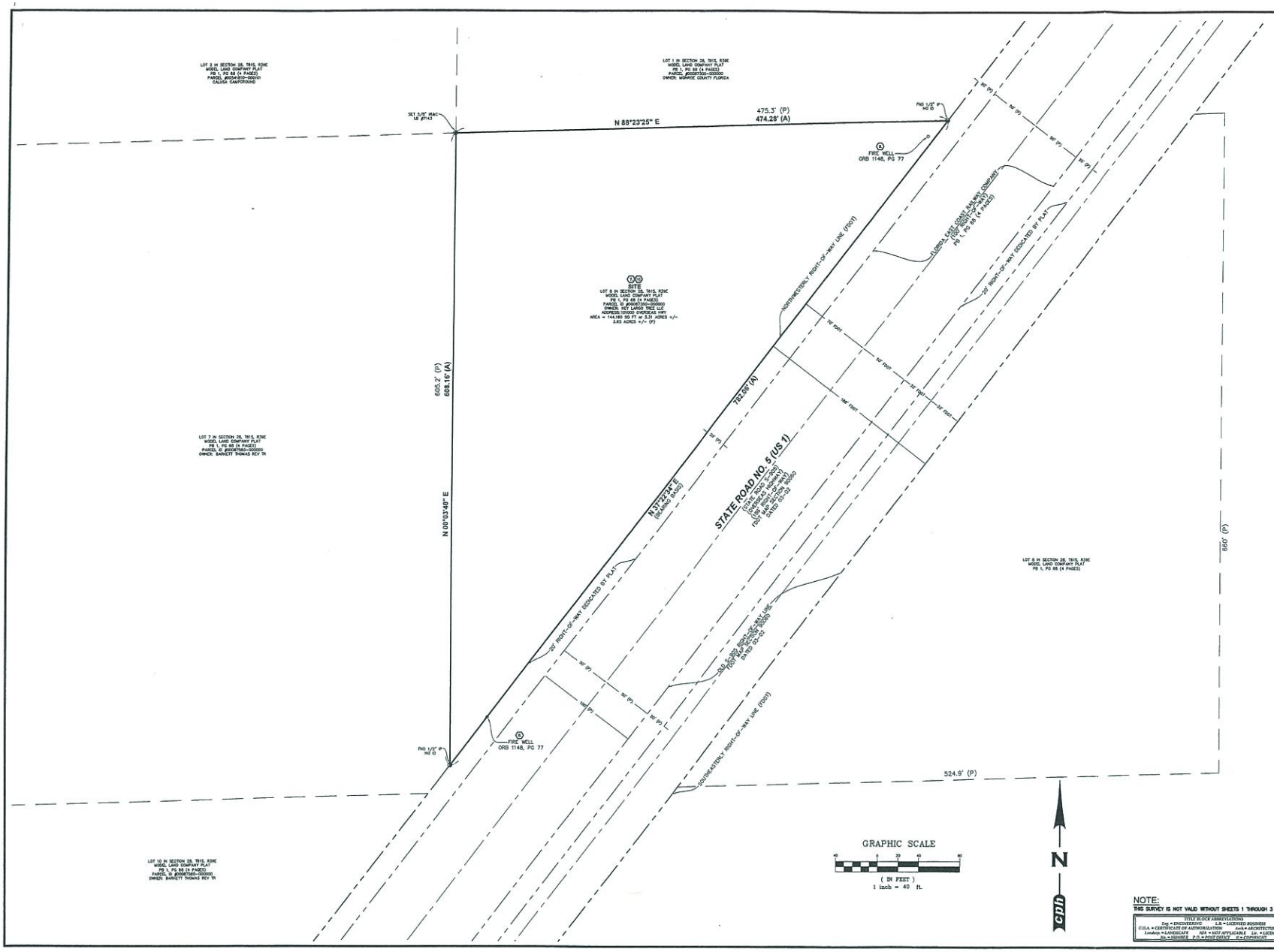
Survey Prepared By:
CPH, Inc.
500 West Fulton St.
Sanford, FL 32771
Ph: 407.322.6841
Licenses:
Eng. C.O.A. No. 3215
Survey L.B. No. 7143
Arch. Lic. No. AA26002926
Lndscp. Lic. No. LC0000256

BOUNDARY & TOPOGRAPHIC SURVEY
ALSO BEING AN
(ALTA/ACSM LAND TITLE SURVEY)

IMC PROPERTY MANAGEMENT
(OVERSEAS HIGHWAY - KEY LARGO)
SECTION 28-TOWNSHIP 61 SOUTH-RANGE 39 EAST
MONROE COUNTY, FLORIDA

Sheet No. 1 of 3



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• Maryland
• Texas

No.	Date	Revision	By

Field Crew: L.S.
Drawn by: J.A.B.
Checked by: R.L.R.
Approved by: T.J.G.
Scale: 1"=40'
Date: 3/25/15
Job No.: 13604
File: 13604.dwg
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Survey Prepared By:
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Sanford, FL 32771
Ph: 407.322.6541
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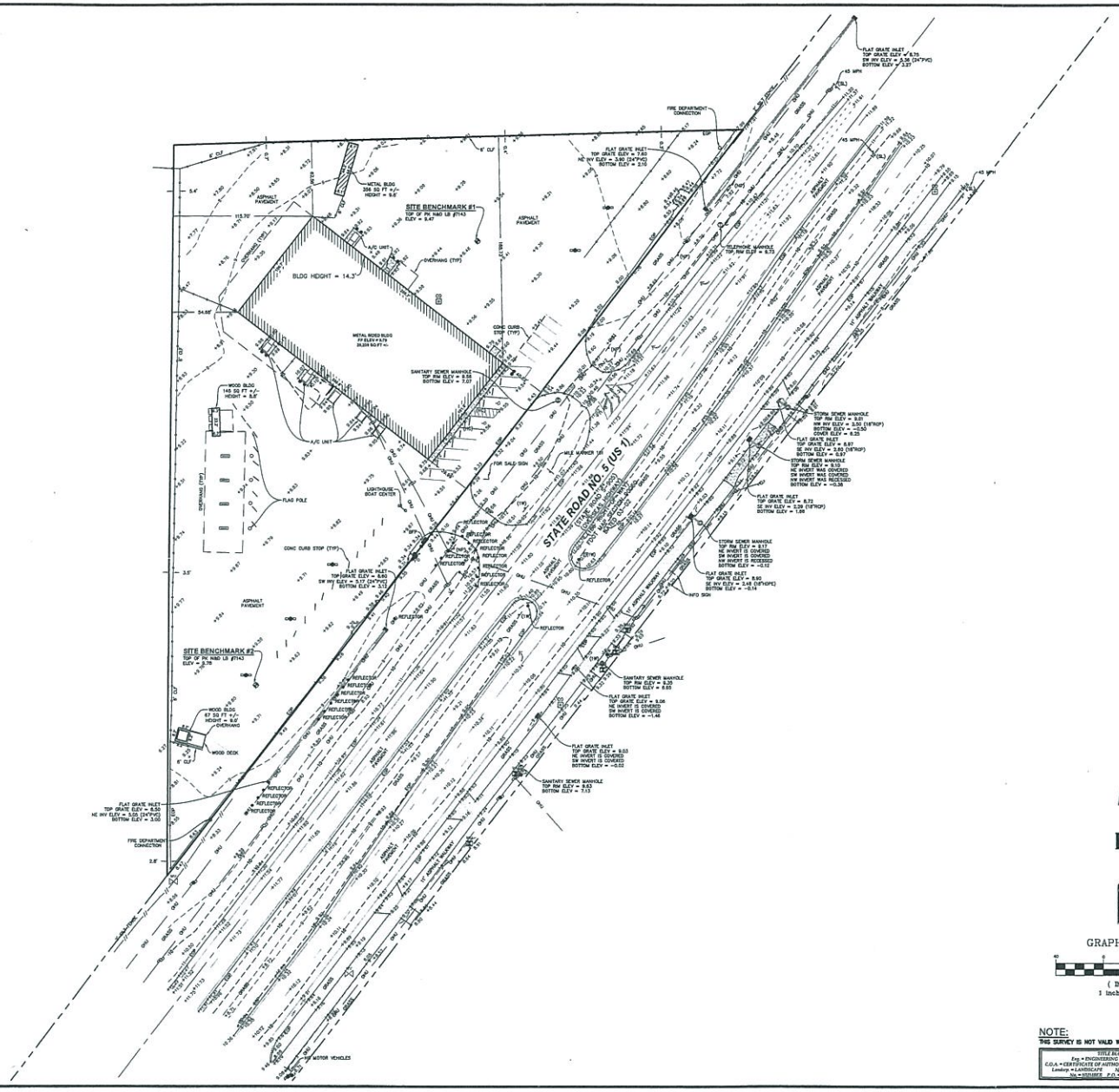
Survey L.B. No. 7143
Arch. Lic. No. AA26000526
Lndscp. Lic. No. LC0000286

BOUNDARY & TOPOGRAPHIC SURVEY
ALSO KNOWN AS
(ALTA/ACSM LAND TITLE SURVEY)

IMC PROPERTY MANAGEMENT
(OVERSEAS HIGHWAY - KEY LARGO)
SECTION 28-TOWNSHIP 61 SOUTH-RANGE 39 EAST
MONROE COUNTY, FLORIDA

Sheet No.
2
of 3



NOTE:
THIS SURVEY IS NOT VALID WITHOUT SHEETS 1 THROUGH 3 OF 3.

TITLE BLOCK ABBREVIATIONS
Eng. = ENGINEERING L.B. = LICENSED BUSINESS
C.O.A. = CERTIFICATE OF AUTHORIZATION L.S. = LICENSED SURVEYOR
Landscape Arch. = LANDSCAPE ARCHITECTURE N/A = NOT APPLICABLE P.L.S. = LICENSED
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• Puerto Rico
• Connecticut
• Maryland
• Texas

No.	Date	Revision	By
1			
2			
3			
4			
5			
6			
7			

Field Crew:	L.S.
Drawn by:	J.A.B.
Checked by:	R.L.R.
Approved by:	T.J.G.
Scale:	1"=40'
Date:	3/25/15
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BOUNDARY & TOPOGRAPHIC SURVEY
ALSO BEING AN
(ALTA/ACSM LAND TITLE SURVEY)

IMC PROPERTY MANAGEMENT
(OVERSEAS HIGHWAY - KEY LARGO)
SECTION 28-TOWNSHIP 61 SOUTH-RANGE 39 EAST
MONROE COUNTY, FLORIDA

Sheet No.
3
of 3

PROPOSED SITE DATA								
Proposed Project Area	=	144,155	sf	=	3.31	acres	=	100%
Total Impervious Area	=	91,456	sf	=	2.10	acres	=	63%
Building	=	18,116	sf	=	0.42	acres	=	13%
Pavement/ Sidewalk	=	73,340	sf	=	1.68	acres	=	51%
Total Pervious Area	=	52,699	sf	=	1.21	acres	=	37%
Open Space	=	52,699	sf	=	1.21	acres	=	37%
Dry Detention	=	0	sf	=	0.00	acres	=	0%

PROPOSED WATER QUALITY

A. First Inch of Runoff Over the Project Site:

Area = 3.31 ac

V_1 = 1 in. x Total Area x 1 ft./12 in.

$V_{1=}$ **0.28** ac-ft

B. Runoff from 2.5 Times the Percent Imperviousness Over the Project Site:

Site Area for WQ

= Total Basin Area - Roof Area

= 3.31 - 0.42

= 2.89 ac

Impervious Area for WQ

= Basin Area for WQ - Pervious Area

= 2.89 - 1.21

= 1.68 ac

% Imperviousness for WQ

= Impervious Area for WQ / Basin Area for WQ

= 58%

For 2.5 Inches Times the % Imperviousness

= 2.5 x Percent Impervious

= 2.5 x 58%

= 1.45 in

Volume Required for Treatment

V_2 = $\frac{1.45 \text{ in} \quad 3.31 \text{ ac} \quad 1 \text{ ft}}{12 \text{ in}}$

V_2 = **0.40 ac-ft**

4.82 ac-in

Maximum allowable volume within the exfiltration trench is 3.28" over the site.

Area = 3.31 ac

V_1 = 3.28 in. x Total Area x 1 ft./12 in.

$V_{1=}$ **0.90** ac-ft

10.85 ac-in

Please see exfiltration trench calculations where the additional volume held in the trench is approximately 6.04 ac-in.

PROPOSED		
SOIL STORAGE		
Depth to Water Table (feet)	**Cumulative Water Storage (inches)**	**Compacted Water Storage (inches)**
1	0.6	0.45
2	2.5	1.88
3	6.6	4.95
4	10.9	8.18

S.H.W.T. Elevation (ft)	1.50	
Average Ground Elevation (ft)	9.40	Open (7.8 ft- 11 ft)
Depth to water table (ft)	7.90	

Since the depth to groundwater is 4' or greater, the Compacted Water Storage 8.18"

Per SFWM,

Soil Storage = Compacted Water Storage x % Perviousness

Soil Storage = 8.18' x 37%

Soil Storage = **3.03** **inches**

EXFILTRATION DESIGN CALCULATIONS

Per SFWMD, Required Length of Trench to Provide

$L = FS\ [(\%WQ)(V_{wq})+V_{add}] / K\ (H_2W + 2H_2\ D_u - D_u^2 + 2H_2D_S) + (1.39 \times 10^{-4})\ W\ D_u$

wheras,

FS= factor of safety; no less than 2
%WQ= precent reduction in required water quality (WQ) treatment volume based on method of WQ treatment: 50% for wet/dry retention
V_{wq}= volume of WQ treatment
D_s = Saturated Depth of Trench (ft)
D_u = Unsaturated Depth (ft)
H_2 = Depth from Land Surface to Water Table (ft)
W = Trench Width (ft)
Volume = Required Wet Detention Volume (ac-in)
Length = Calculated Trench Length (ft)
K = Hydraulic Conductivity (cfs/ft^2-ft)

K, Hydraulic Conductivity

K_1 5.72E-04
K_2 6.57E-04
K_3 6.36E-04
Average K 6.2E-04

These values correspond to the results provided within the Geotechnical Report in Appendix B

Water Quality

WQ Volume Required = **0.90 ac-ft**

Volume (ac-in) = (Area * runoff retained)
Volume (ac-in) = 10.85
FS= 2.00
WQ= 0.50
V_{wq}= 4.82
V_{add}= 6.04
D_s (ft) = 3.00
D_u (ft) = 4.35
H_2 (ft)= 6.35
W (ft) = 5.00
K (cfs/ft^2) = 6.22E-04
L (ft) = 244.74

Actual Trench Provided L = **271** ft

This calculation states 245 linear feet of trench is required to provide the 0.90 ac-ft.

WQ = 0.4 ac-ft (4.82 ac-ft)
Add Vol 0.9 ac-ft - 0.4 ac-ft = 0.5 ac-ft (6 ac-in)

PROPOSED STAGE-STORAGE CALCULATIONS				
Stage (ft)	**Storage (ac-ft)**			
	0.90 ac Exfil 1.5-5.85	1.68 ac Pvmt 7.85-10	1.21 ac Open 7.8-11	**Total (ac-ft)**
1.5	0.00	0.00	0.00	0.00
2	0.10	0.00	0.00	0.10
2.5	0.20	0.00	0.00	0.20
3	0.30	0.00	0.00	0.30
3.5	0.40	0.00	0.00	0.40
4	0.50	0.00	0.00	0.50
4.5	0.60	0.00	0.00	0.60
5	0.70	0.00	0.00	0.70
5.5	0.80	0.00	0.00	0.80
6	0.90	0.00	0.00	0.90
6.5	0.90	0.00	0.00	0.90
7	0.90	0.00	0.00	0.90
7.5	0.90	0.00	0.00	0.90
8	0.90	0.01	0.01	0.92
8.5	0.90	0.17	0.09	1.16
9	0.90	0.52	0.27	1.69
9.5	0.90	1.06	0.55	2.51
10	0.90	1.81	0.92	3.63

Project Name: IMC- Key Largo Commercial Center
Reviewer: HH
Project Number: I3604
Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr
Time Step: 0.2 hr, Iterations: 10

Basin 1: Site

Method: Santa Barbara Unit Hydrograph
Rainfall Distribution: SFWMD - 24 hr
Design Frequency: 5 year
1 Day Rainfall: 6 inches
Area: 3.31 acres
Ground Storage: 3.03 inches
Time of Concentration: 0.17 hours
Initial Stage: 1.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
1.50	0.00
2.00	0.10
2.50	0.20
3.00	0.30
3.50	0.40
4.00	0.50
4.50	0.60
5.00	0.70
5.50	0.80
6.00	0.90
6.50	0.90
7.00	0.90
7.50	0.90
8.00	0.92
8.50	1.16
9.00	1.69
9.50	2.51
10.00	3.63

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Site	8.07	25.60	1.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Site	0.95	0.00	0.00	0.00	0.95	0.00

Project Name: IMC- Key Largo Commercial Center
Reviewer: HH
Project Number: I3604
Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr
Time Step: 0.2 hr, Iterations: 10

Basin 1: Site

Method: Santa Barbara Unit Hydrograph
Rainfall Distribution: SFWMD - 24 hr
Design Frequency: 25 year
1 Day Rainfall: 8 inches
Area: 3.31 acres
Ground Storage: 3.03 inches
Time of Concentration: 0.17 hours
Initial Stage: 1.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
1.50	0.00
2.00	0.10
2.50	0.20
3.00	0.30
3.50	0.40
4.00	0.50
4.50	0.60
5.00	0.70
5.50	0.80
6.00	0.90
6.50	0.90
7.00	0.90
7.50	0.90
8.00	0.92
8.50	1.16
9.00	1.69
9.50	2.51
10.00	3.63

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Site	8.77	25.60	1.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Site	1.45	0.00	0.00	0.00	1.45	0.00

Project Name: IMC- Key Largo Commercial Center
Reviewer: HH
Project Number: I3604
Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr
Time Step: 0.2 hr, Iterations: 10

Basin 1: Site

Method: Santa Barbara Unit Hydrograph
Rainfall Distribution: SFWMD - 3day
Design Frequency: 25 year
3 Day Rainfall: 11.8 inches
Area: 3.31 acres
Ground Storage: 3.03 inches
Time of Concentration: 0.17 hours
Initial Stage: 1.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
1.50	0.00
2.00	0.10
2.50	0.20
3.00	0.30
3.50	0.40
4.00	0.50
4.50	0.60
5.00	0.70
5.50	0.80
6.00	0.90
6.50	0.90
7.00	0.90
7.50	0.90
8.00	0.92
8.50	1.16
9.00	1.69
9.50	2.51
10.00	3.63

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Site	9.45	73.60	1.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Site	2.43	0.00	0.00	0.00	2.43	0.00

Project Name: IMC- Key Largo Commercial Center
Reviewer: HH
Project Number: I3604
Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr
Time Step: 0.2 hr, Iterations: 10

Basin 1: Site

Method: Santa Barbara Unit Hydrograph
Rainfall Distribution: SFWMD - 3day
Design Frequency: 100 year
3 Day Rainfall: 14 inches
Area: 3.31 acres
Ground Storage: 3.03 inches
Time of Concentration: 0.17 hours
Initial Stage: 1.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
1.50	0.00
2.00	0.10
2.50	0.20
3.00	0.30
3.50	0.40
4.00	0.50
4.50	0.60
5.00	0.70
5.50	0.80
6.00	0.90
6.50	0.90
7.00	0.90
7.50	0.90
8.00	0.92
8.50	1.16
9.00	1.69
9.50	2.51
10.00	3.63

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

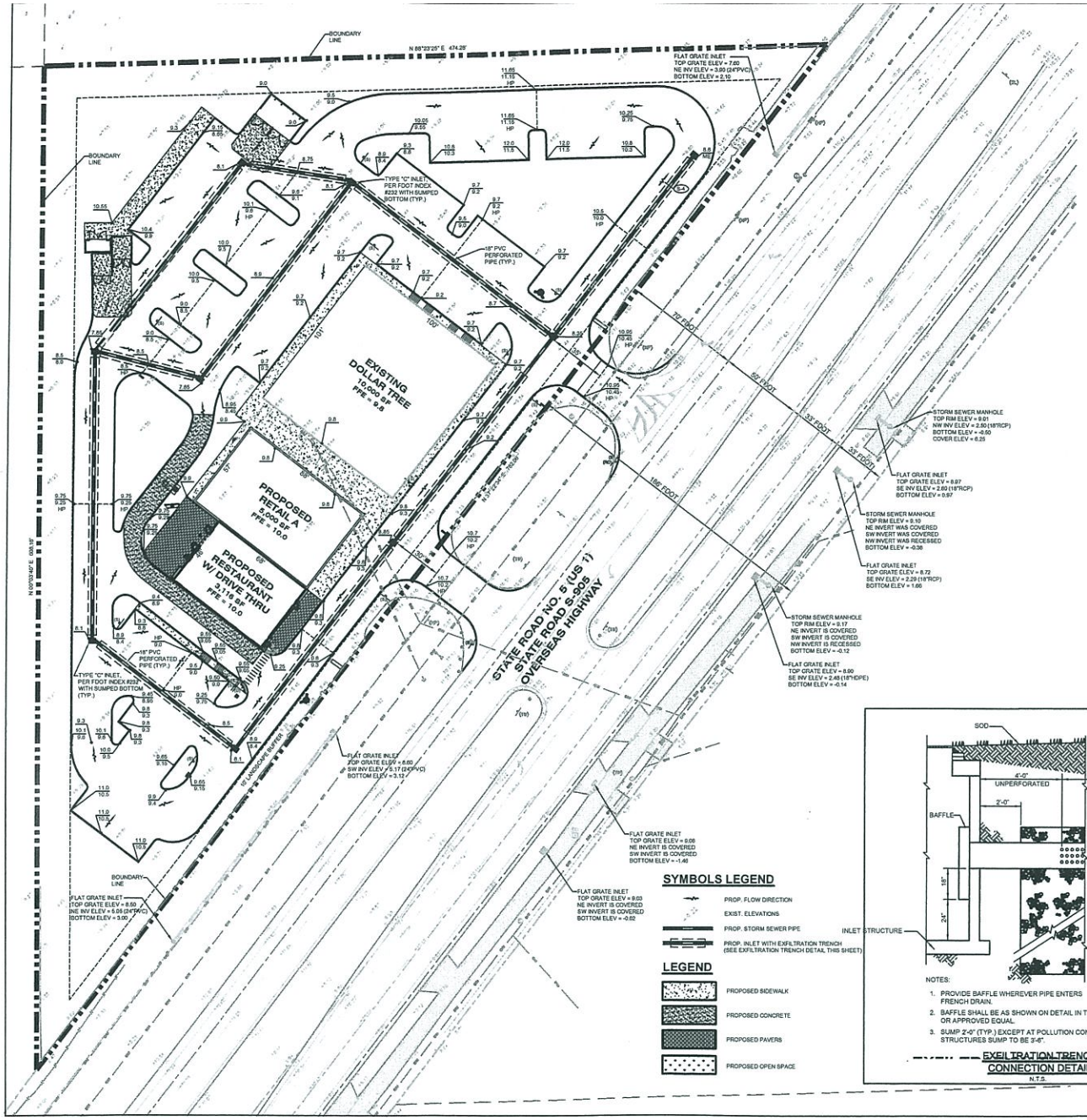
Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Site	9.72	73.40	1.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Site	3.01	0.00	0.00	0.00	3.01	0.00



SYMBOLS LEGEND

- PROP. FLOW DIRECTION
- EXIST. ELEVATIONS
- PROP. STORM SEWER PIPE
- PROP. INLET WITH EXFILTRATION TRENCH (SEE EXFILTRATION TRENCH DETAIL THIS SHEET)

LEGEND

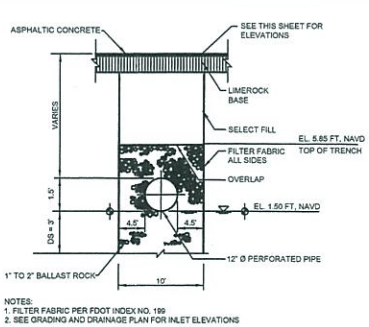
- PROPOSED SIDEWALK
- PROPOSED CONCRETE
- PROPOSED PAVERS
- PROPOSED OPEN SPACE

LAND USE CALCULATION

PROPOSED PERVIOUS AREA	52,699 S.F. (37%)
PROPOSED IMPERVIOUS AREA	91,456 S.F. (63%)
OPEN SPACE REQUIRED	20% MIN.

NOTES:
1. PROVIDE BAFFLE WHEREVER PIPE ENTERS FRENCH DRAIN.
2. BAFFLE SHALL BE AS SHOWN ON DETAIL IN THIS SHEET OR APPROVED EQUAL.
3. SUMP 2'-0" (TYP.) EXCEPT AT POLLUTION CONTROL STRUCTURES SUMP TO BE 3'-6".

EXFILTRATION TRENCH CONNECTION DETAIL
N.T.S.



NOTES:
1. FILTER FABRIC PER FDOT INDEX NO. 199
2. SEE GRADING AND DRAINAGE PLAN FOR INLET ELEVATIONS

ALL ELEVATIONS WITHIN THESE PLANS ARE IN THE NORTH AMERICAN VERTICAL DATUM OF 1988

18" EXFILTRATION TRENCH DETAIL
N.T.S.

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CHRISTOPHER COLLINS, P.E. No.# 73819

No.	Date	Revision	By
1	10-05-15	REVISED PER CITY COMMENTS (DATED 09-16-15)	A.T.S.

Designed by: C.P.C.
Drawn by: A.T.S.
Checked by: C.P.S.
Approved by: C.P.S.
Scale: 1"=20'
Date: 04-13-15
Job No.: 13004
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Ph: 407.322.6841
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Survey L.B. No. 7143
Arch. Llc. No. AA26000926
Lndscp. Llc. No. LC0000288

STORMWATER/ SURFACE WATER MANAGEMENT PLAN

IMC - KEY LARGO COMMERCIAL CENTER

101000 OVERSEAS HIGHWAY
MONROE COUNTY / FLORIDA

Sheet No.
C-3

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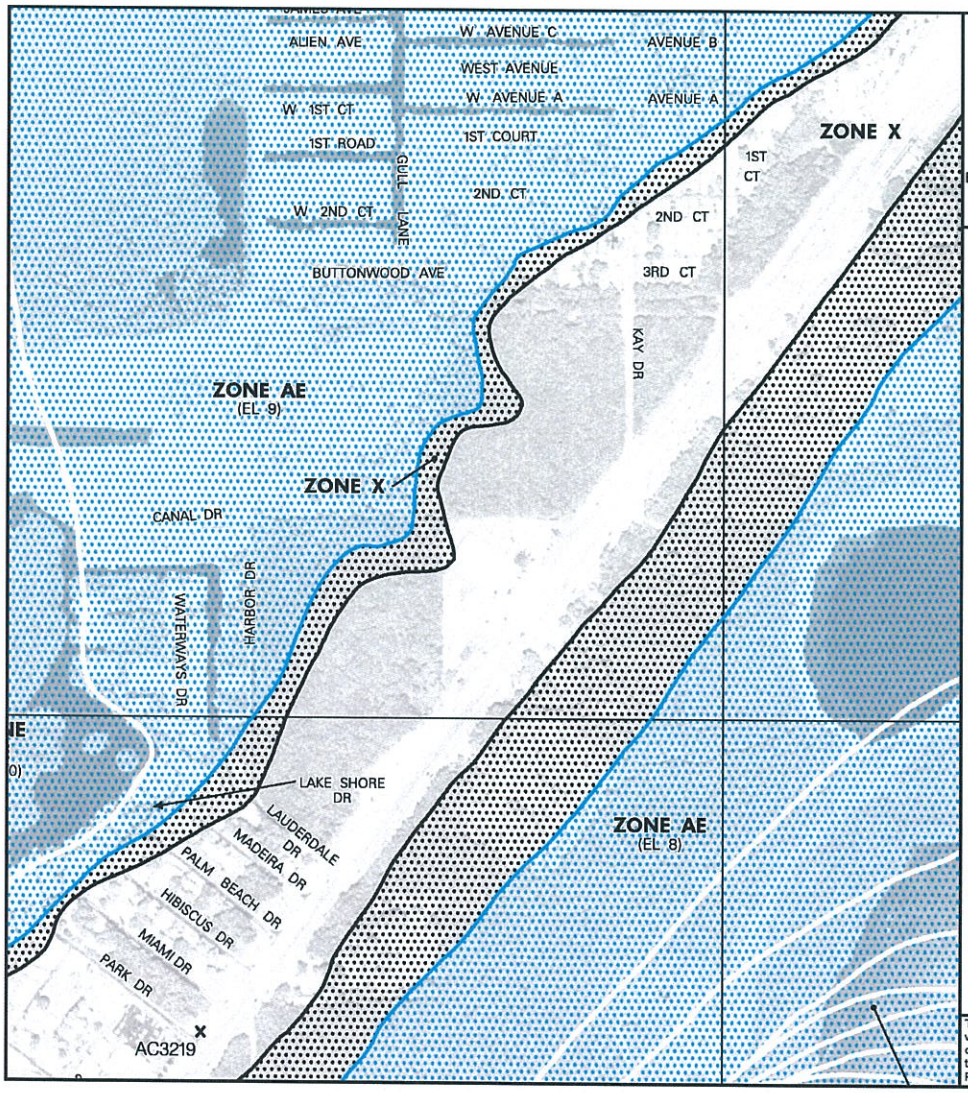
Landscape Architects
Planners
Transportation/Traffic

1992 SW 1st Street
Miami, FL 33135
Phone: 305.274.4805
Fax: 305.274.4807

APPENDIX A

Exhibit 1 – AERIAL Map
Exhibit 2 – FEMA FIRM Map
Exhibit 3 – Broward County 100 Year Flood Elevation
Exhibit 4 – Soil Map- Custom Soil Resource Report
Exhibit 5 – SFWMD Rainfall 5 year- 1 day
Exhibit 6 – SFWMD Rainfall 25 year- 3 day
Exhibit 7 – SFWMD Rainfall 100 year- 3 day


Aerial Map- IMC Key Largo
Buttonwood Ave
3rd Ct
Calusa St
Canal
101000 Overseas Hwy
5
Harbor Dr
Lake Shore Dr
Lauderdale Dr
Madeira Dr
Overseas Hwy
© 2016 Google
1994
Imagery Date: 12/16/2014 25°06'33.19" N 80°25'38.06" W elev 9 ft



MAP SCALE 1" = 500'

250 0 500 1000 FEET

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0931K

FIRM

FLOOD INSURANCE RATE MAP

MONROE COUNTY, FLORIDA AND INCORPORATED AREAS

PANEL 931 OF 1585

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MONROE COUNTY	125129	0931	K

-NOTE-

THIS MAP INCORPORATES APPROXIMATE BOUNDARIES OF COASTAL BARRIER RESOURCES SYSTEM UNITS AND/OR OTHERWISE PROTECTED AREAS ESTABLISHED UNDER THE COASTAL BARRIER IMPROVEMENT ACT OF 1990 (PL 101-591).

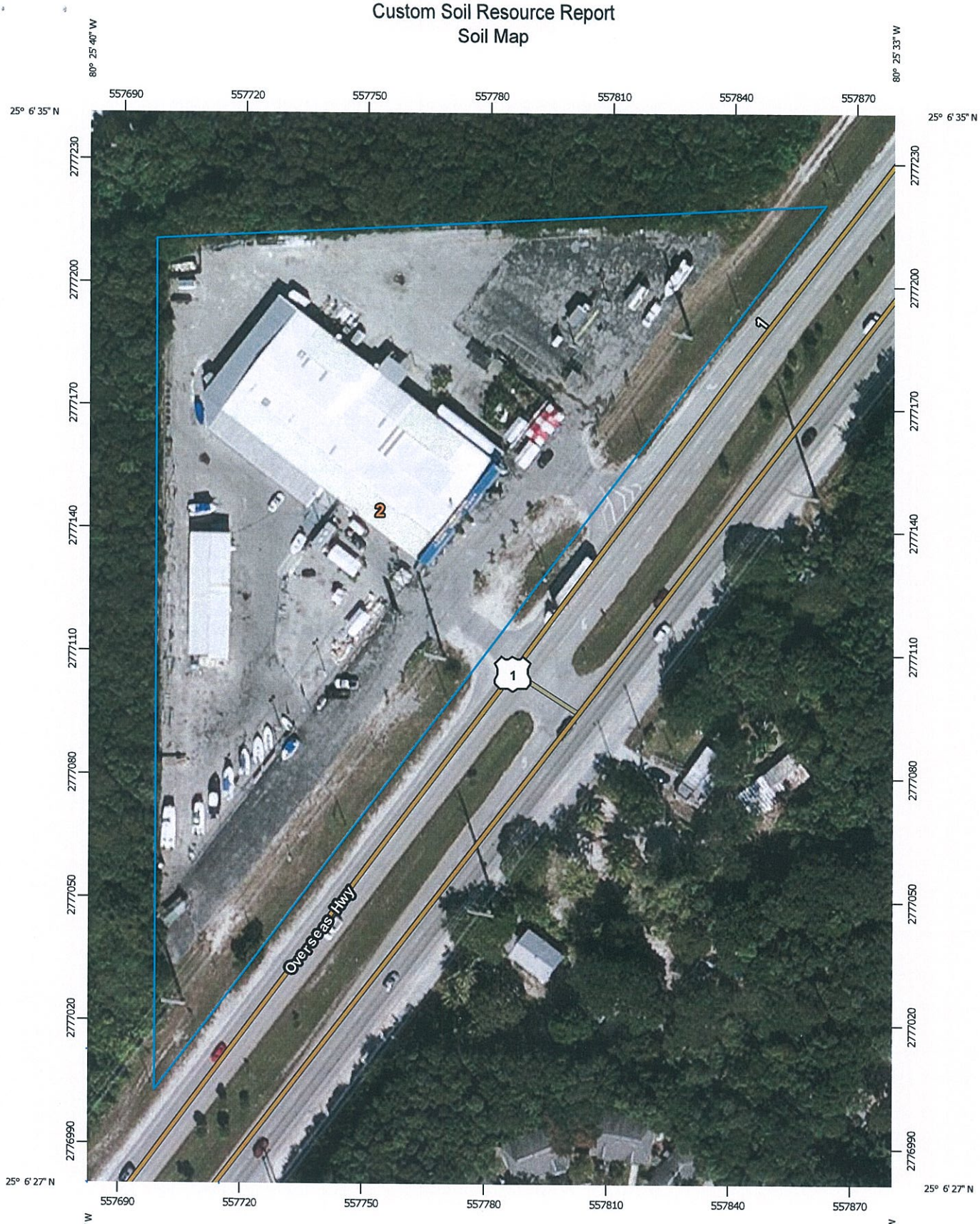
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 12087C0931K

MAP REVISED FEBRUARY 18, 2005

Federal Emergency Management Agency

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,270 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Monroe County, Keys Area, Florida
Survey Area Data: Version 7, Nov 19, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 11, 2010—Dec 14, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Monroe County, Keys Area, Florida (FL687)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Pennekamp gravelly muck, 0-2 percent slopes, extremely stony	4.2	100.0%
Totals for Area of Interest		**4.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

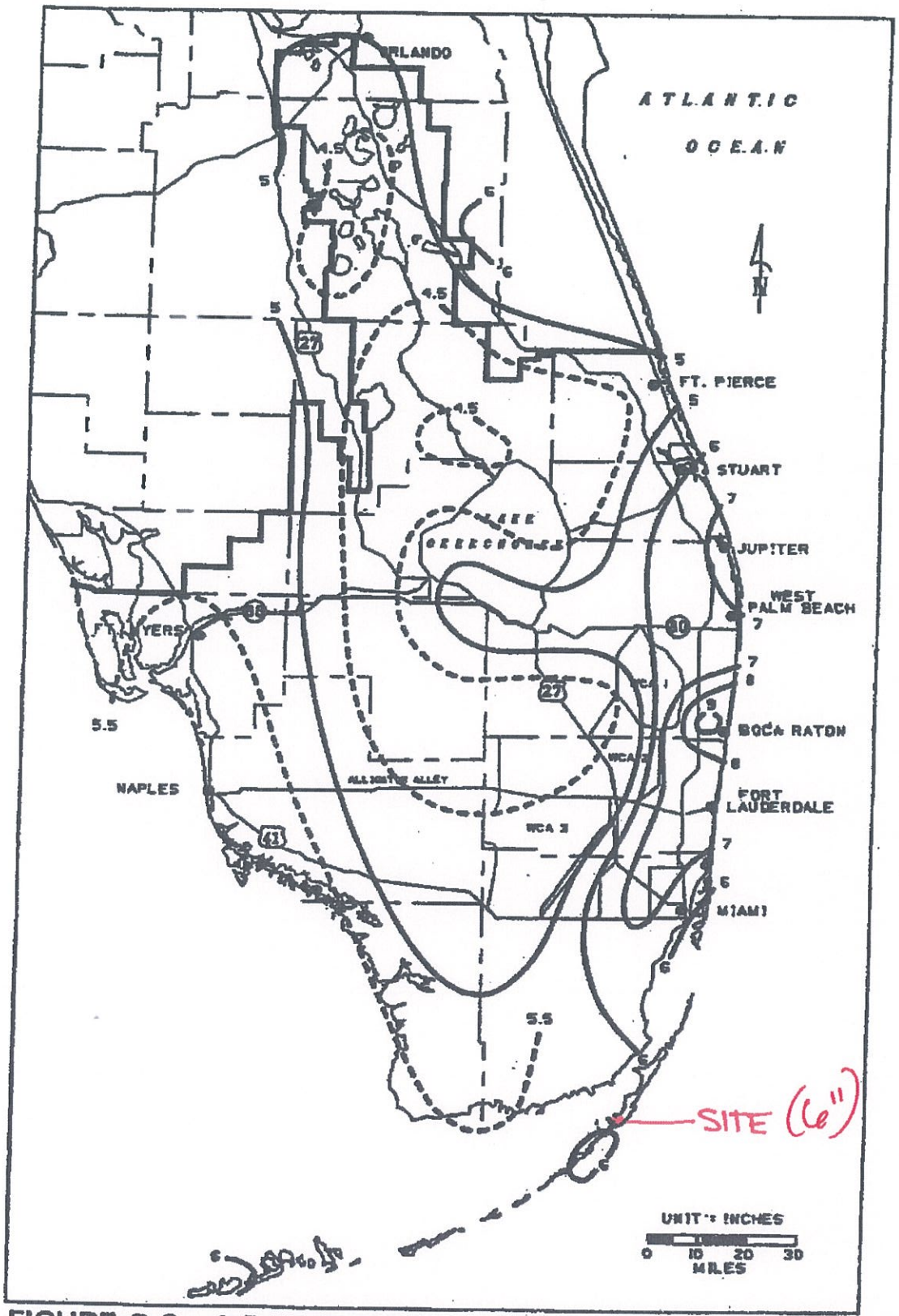


FIGURE C-3. 1-DAY RAINFALL: 5-YEAR RETURN PERIOD

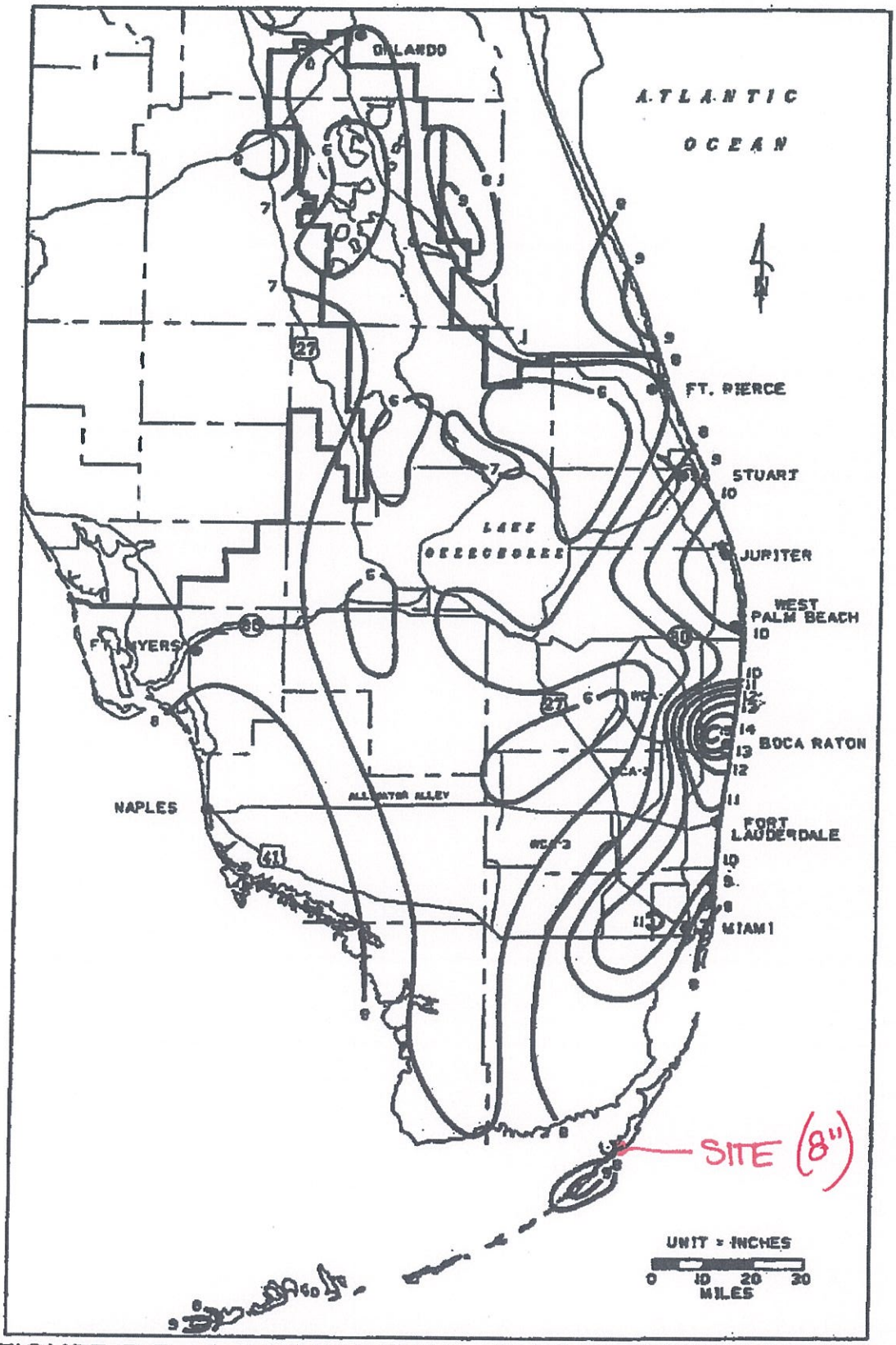


FIGURE C-5. 1-DAY RAINFALL: 25-YEAR RETURN PERIOD

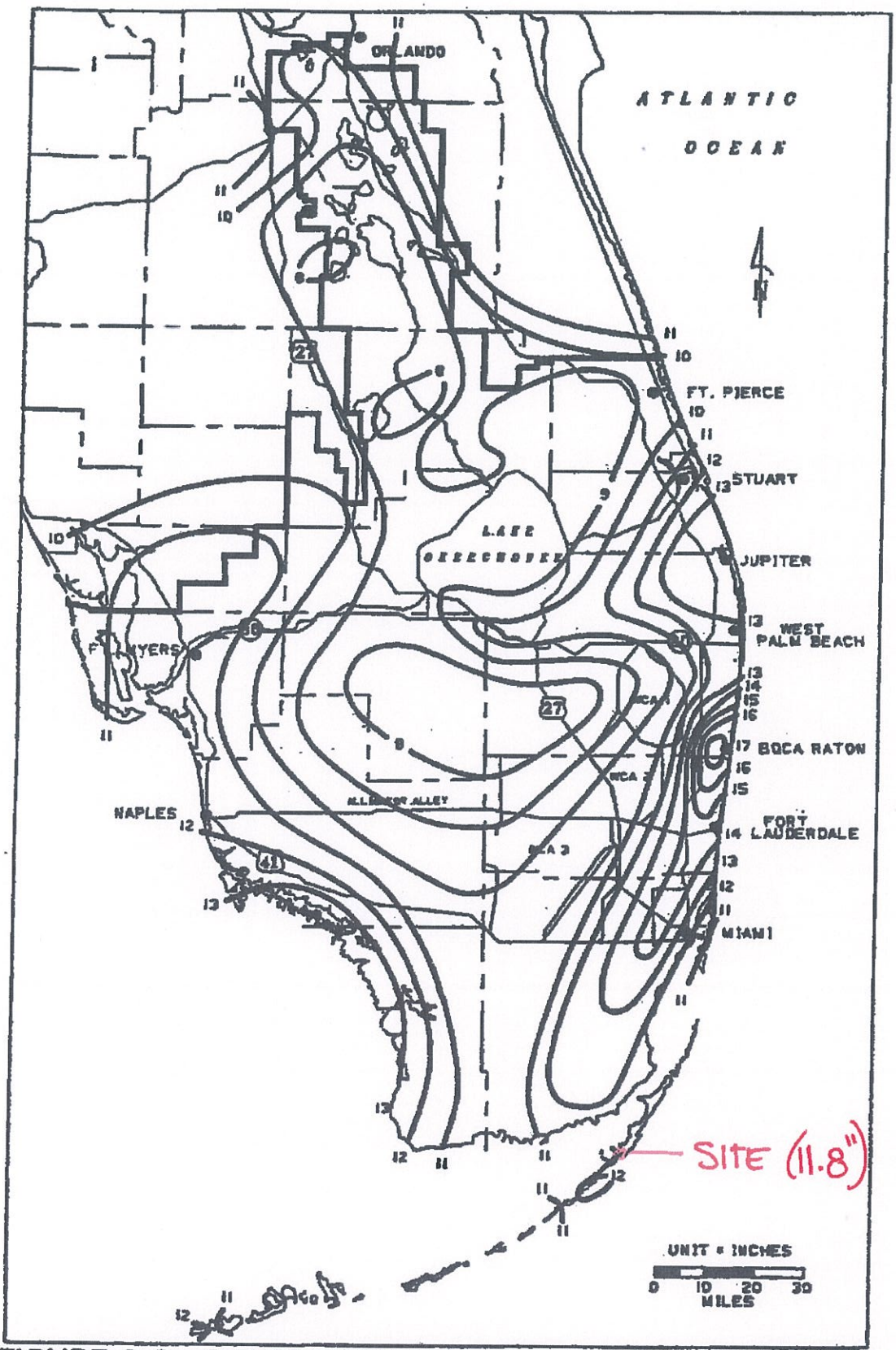


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

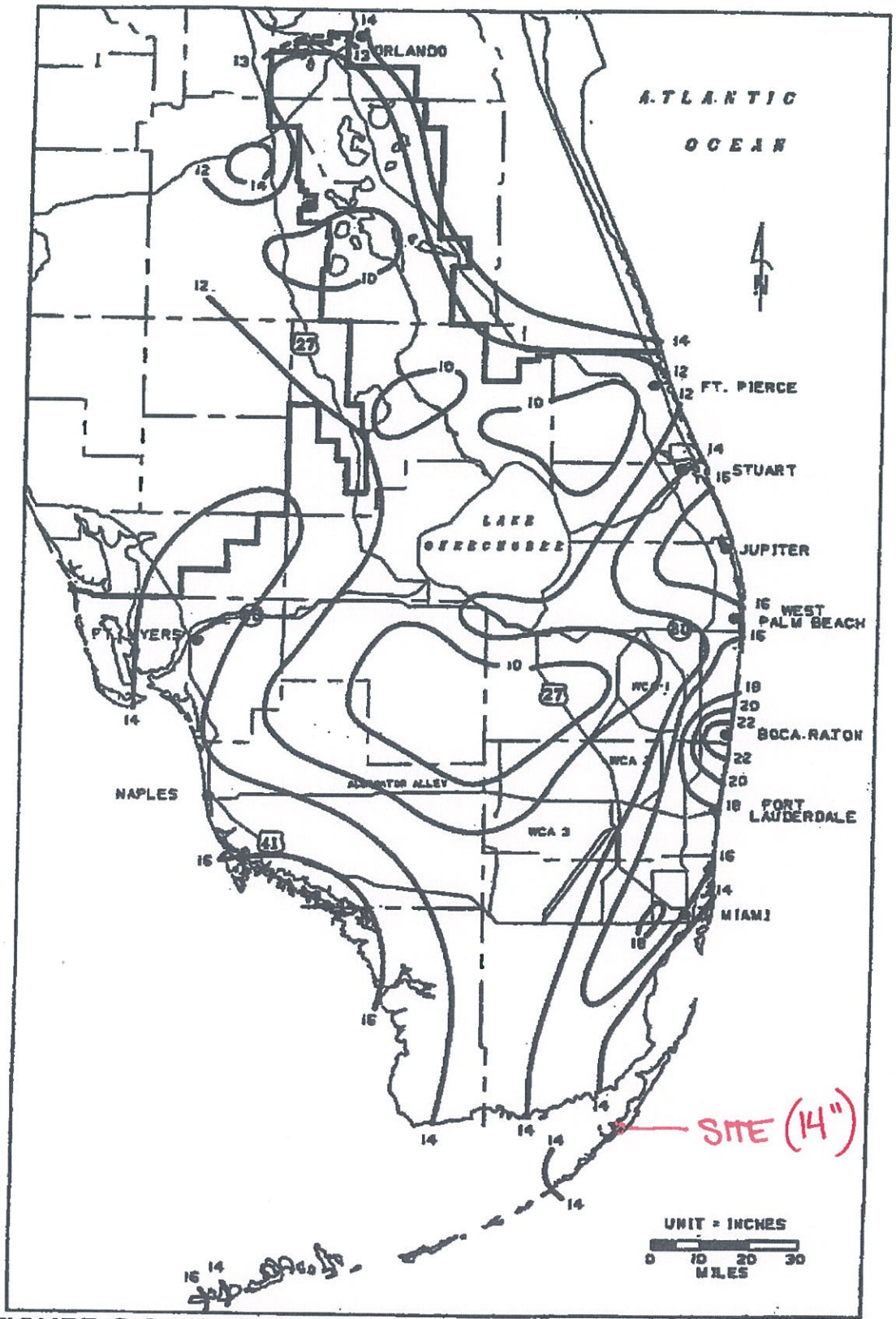


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD

Architects
Environmental
M/E/P
Surveyors

Engineers
Landscape Architects
Planners
Transportation/Traffic

1992 SW 1st Street
Miami, FL 33135
Phone: 305.274.4805
Fax: 305.274.4807

APPENDIX B

Geotechnical Report prepared by PSI, Inc. dated May 3, 2014.

UNIVERSAL
ENGINEERING SCIENCES

GEOTECHNICAL ENGINEERING REPORT

KEY LARGO COMMERCIAL CENTER

101000 OVERSEAS HIGHWAY
KEY LARGO, MONROE COUNTY, FL

UES PROJECT NO. 2130.1500074
UES REPORT NO. G00157

Prepared For:

Mr. Yoram Izhak
Managing Member
Beach Holding, Inc.
696 NE 125th Street
North Miami, FL 33161

Prepared By:

Universal Engineering Sciences
9960 NW 116th Way, Suite 8
Miami, Florida 33178
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November 5, 2015

Beach Holding, Inc.
696 NE 125th Street
North Miami, FL 33161

Attention: Mr. Yoram Izhak
Managing Member

Reference: **Geotechnical Engineering Report**
Key Largo Commercial Center
101000 Overseas Highway
Ker Largo, Monroe County, Florida
UES Project No. 2130.1500074
UES Report No. G00157

Dear Mr. Izhak:

Universal Engineering Sciences, Inc. (UES) has completed a subsurface exploration for the above-referenced project in Key Largo, Monroe County, Florida. The scope of this exploration was conducted in general accordance with our proposal No. 2130.1015.00002 dated October 1, 2015. Authorization was provided by you by means of sign proposal on October 14, 2015. This exploration was performed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

This report contains the results of the subsurface exploration, an engineering interpretation of the results with respect to the project characteristics as described, and recommendations for groundwater considerations, foundation design, pavement design and site preparation.

We appreciate the opportunity to work with you on this project and look forward to a continued association. If you have any questions, or when preliminary or final project design plans are available for our recommended review, please contact the undersigned.

Respectfully submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

Steve Jaime, E.I.
Staff Engineer

REINALDO JESUS VILLA LICENSE No 72242 STATE OF FLORIDA PROFESSIONAL ENGINEER

5/13

Reinaldo Villa, M.S., P.E.
Branch Manager / Senior Geotechnical Engineer
FL Professional Engineer No. 72242

Dist: Client (1)
Files (1)

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APPENDICES

1.0 INTRODUCTION

1.1 GENERAL

This report contains the results of a geotechnical exploration conducted for the proposed commercial center located at 101000 Overseas Highway, Monroe County, Florida. A general location map of the project area appears in Appendix A: Site Vicinity Map. This report has been divided into the following sections:

- SCOPE OF SERVICES - Defines what services were completed
- FINDINGS - Describes what was encountered
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- SUMMARY - Reviews the material in this report
- APPENDICES - Presents support materials referenced in this report

1.2 PROJECT DESCRIPTION

Our understanding of the proposed construction is based on information and a conceptual site plan provided to us by CPH, Inc. We understand that the project consists of constructing a retail store with a building footprint of 6,000 square-feet, and a restaurant with a building footprint of 3,116 square-feet with associated paved parking and drainage improvements. The conceptual site plan provided was referenced for our subsurface exploration and geotechnical report.

At this point we have not been provided with any structural loading information. For purposes of preparing this geotechnical report, we are assuming that column and wall loads will not exceed 100 kips and 4 kips/foot, respectively. We are assuming that the proposed construction will consist of conventional masonry construction. Based on our site visit, the project site is relatively flat. However, we are anticipating that no more than one (1) foot of additional fill materials will be required to bring the site to finished grade.

We note that since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations, grade alterations, and actual structural loads applied, UES must review the preliminary and final site and grading plans, and structural design loads to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

2.0 SCOPE OF SERVICES

2.1 PURPOSE

The purposes of this geotechnical exploration were:

- to explore and evaluate the subsurface conditions at the site by advancing SPT (Standard Penetration Test) test borings with special attention to potential geotechnical considerations that may affect the proposed design, construction, and serviceability of the proposed improvements;

- to provide geotechnical engineering recommendations for groundwater considerations, foundation design, pavement design, and site preparation.

This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. UES would be pleased to perform these services, if you desire.

2.2 FIELD EXPLORATION

The subsurface conditions at the site were explored with the performance of eleven (11) test borings. Standard Penetration Test (SPT) borings (designated as B-1 and B-2) were performed to depths of 15 feet below existing grades in the proposed building footprint of the retail store. SPT borings (designated as B-3 and B-4) were performed to depths of 15 feet below existing grades in the proposed building footprint of the restaurant. SPT boring (designated as B-5) was performed to depths of 15 feet below existing grade for the proposed restaurant drive thru sign. SPT borings (designated as P-1 through P-6) were performed to depths of 6 feet below existing grades in the proposed paved areas throughout the site. Additionally, three (3) exfiltration tests (designated as E-1 through E-3) were performed at depths of 15 feet below existing grade for use in drainage evaluation and design. The exfiltration tests were performed in general accordance with the usual open-hole method promulgated by the South Florida Water Management District. The approximate locations of the test borings are presented in Appendix B titled "Test Location Plan".

A representative of UES located the borings in the field based upon estimated distances, relationships to obvious landmarks and the conceptual site plan provided to us. Therefore, consider the indicated test locations and depths to be approximate.

The SPT borings were advanced to depths ranging from 6 to 15 feet below existing grades using the rotary wash method; samples were collected while performing the SPT at regular intervals. We completed the SPT in general accordance with ASTM D-1586 guidelines, with continuous sampling from 0 to 10 feet, and then at 5-foot sampling intervals. The SPT test consists of driving a standard split-barrel sampler (split-spoon) into the subsurface using a 140-pound hammer free-falling 30 inches. The number of hammer blows required to drive the sampler 12 inches, after first seating it 6 inches, is designated the penetration resistance, or SPT-N value. This value is used as an index to soil strength and consistency. All SPT borings were performed with the use of an automatic hammer.

Samples collected during the SPT were placed in clean sample containers and transported to our laboratory where they were visually classified by a member of our geotechnical engineering staff in accordance with ASTM D-2488.

2.3 LABORATORY TESTING

The soil/rock samples recovered from the test borings were returned to the laboratory where a member of our geotechnical staff visually classified them, reviewed the field descriptions, and selected representative samples for laboratory tests. No tests were performed to aid in classifying the soils and to help evaluate the general engineering characteristics of the site soils.

3.0 FINDINGS

3.1 SURFACE CONDITIONS

The site of the proposed commercial center is located at 101000 Overseas Highway, Monroe County, Florida. At the time of our visit, the site was partially occupied by a existing Family Dollar Store near the center of the site. The surrounding areas had asphalt pavement which was being used as a boat and RV storage. Based on our visual observation, the areas of the site surface which were covered with asphalt pavement, in our opinion, appeared to be in poor condition with cracks visible at the ground surface.

Based on the 1989 Soil Survey for Monroe County, Key Area, Florida, as prepared by the US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), the predominant soil type at the site is identified as Pennekamp gravelly muck.

Pennekamp gravelly muck is on tropical hammocks in the uplands of the upper keys. About 10 percent of the surface of this soil is covered with stones that are dominantly 10 to 20 inches in diameter.

3.2 SUBSURFACE CONDITIONS

The results of our field exploration, laboratory tests, together with pertinent information obtained from the SPT borings, such as soil profiles, penetration resistance and groundwater levels are shown on the boring logs included in Appendix B. The Key to Boring Logs is also included in Appendix B. The stratification lines shown on the boring logs represent the approximate boundaries between soil types, and may not depict exact subsurface soil conditions. The actual soil boundaries may be more transitional than depicted. A generalized profile of the soils found at our boring locations is presented in Table 1. The soil profile was prepared from field logs after the recovered soil samples were visually classified by a member of our geotechnical staff.

TABLE 1: GENERAL SOIL PROFILE	
Typical Depths Below Grade (feet)	**Soil Description**
0 to 8	Light Brown, Dense to Very Dense, Slightly Silty, Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)
8 to 15*	Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)
* Maximum Boring Explored Depth	

Groundwater was measured at depths ranging from 8 to 8.3 feet below existing grades in the test borings at the time of drilling. It should be noted that the groundwater levels were recorded during the wet season. The variation in measured groundwater levels may be due to differences in ground surface elevations a cross the site and regional tidal conditions.

4.0 RECOMMENDATIONS

4.1 GENERAL

The following recommendations are made based upon the attached test boring logs, our stated understanding of the proposed construction, and our experience with similar projects and subsurface conditions. If subsurface conditions are encountered during construction which were not encountered in the borings, those conditions should be reported immediately to UES for evaluation and possible recommendations. In this section of the report, recommendations are presented for groundwater considerations, structure foundations, pavement design, site preparation, and construction related services.

We note that since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations, grade alterations, and actual structural loads applied, UES must review the preliminary and final site and grading plans, and structural design loads to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

4.2 GROUNDWATER CONSIDERATIONS

The groundwater table will fluctuate seasonally depending upon local rainfall. The rainy season in South Florida is normally between May and October. Based upon the test boring data, a reasonable estimate for the seasonal high groundwater table is approximately 6 feet below existing grade. The existing and estimated seasonal high groundwater table at each location appears on the boring logs in Appendix B.

Note that our estimate of seasonal high groundwater level is based on limited data and does not provide any assurance that groundwater levels will not exceed the estimated level during any given year in the future. If the rainfall intensity and duration or total rainfall quantities exceed those normally anticipated, then groundwater levels will likely exceed the seasonal high estimate.

The estimate of seasonal high groundwater level is made for the site at the present time. Future development of adjoining or nearby properties and development on a regional scale may affect the local seasonal high groundwater table. Universal makes no warranty on the estimate of the seasonal high groundwater table.

UES recommends that all foundation and pavement design incorporate assumption of the seasonal high groundwater condition. We recommend that positive drainage be established and maintained on the site during construction. UES further recommends that permanent measures be implemented to maintain positive drainage throughout the life of the project.

The performance of site improvements may be sensitive to their post-construction relationship to site groundwater levels, seepage zones, or soil/rock characteristics exposed at final grades. Since horizontal and vertical control of our site borings was not provided, we do not recommend the use of our boring stratigraphy or groundwater information for final grading and improvement design purposes. Such use could result in potentially unacceptable performance of site improvements and/or additional costs for unanticipated construction modifications. UES will not be responsible or liable for the consequences of such use. UES recommends that use of boring information for final design of all site improvements be predicated on proper horizontal and vertical control of borings.

4.3 STRUCTURE FOUNDATIONS

4.3.1 ANALYSIS

Based on near coastal setting of the site, we recommend that the proposed structure be supported on a deep foundation system to transfer the structural loads to competent rock material to reduce the risk of excessive uplift force and prevent undermining if shallow foundations are used for support of the proposed structures. The following paragraphs provide recommendations for deep foundations for the proposed commercial center.

4.3.2 DEEP FOUNDATIONS - AXIAL CAPACITY OF ACIP PILES

We recommend that the proposed structures that will be part of the commercial center be supported on a deep foundation system which extends into the natural limestone formation. For support of the proposed structures, we recommend that the use of Auger Cast-In-Place (ACIP) piles due to their relatively low cost compared to other deep foundations. We recommend that the ACIP piles penetrate into the natural limestone formation in order to develop the required compression and tension capacities as well as to limit settlement. Table B of this report presents a summary of the allowable compression, uplift and lateral load capacities that the ACIP pile may develop as well as anticipated pile lengths for diameters ranging from 14 to 18 inches.

The ACIP pile capacities were estimated using the procedures for cohesionless soils developed by O'Neill and Reese (1999) outlined in the *Geotechnical Engineering Circular No. 8: Design and Construction of Continuous Flight Auger Piles (2007)* developed by the FHWA as well as the shear strength values for the natural limestone formation derived for the local rock formations with established empirical correlations presented in the FHWA publication. Essentially, the capacities were estimated by summing the product of the effective lateral stresses on the pile and the soil profile friction over the length of the piles due to skin friction only. The Structural Engineer shall specify the required pile reinforcement to withstand the design compression, tension and lateral loads.

4.3.3 DEEP FOUNDATIONS - LATERAL LOAD CAPACITIES

We have performed lateral load capacity evaluations for ACIP piles using a rock embedment into the natural limestone formation. The lateral load analyses of ACIP piles have been performed using the software LPILE v6.0 developed by Ensoft, Inc. The analyses presented herein are based on pile stiffness (EI), estimated using 100 percent of the gross value of EI value. The modulus of elasticity for grout (E_g) was estimated to be 3,094 kips per square inch (ksi) using a 28-day grout compressive strength (f'_c) of 4,000 psi. The pile-head was considered to be free and fixed-headed. A summary of the laterally loaded pile capacity evaluations for the ACIP piles is presented on Table B of this report. It is to be noted that The Structural Engineer shall design the reinforcement for the ACIP piles.

4.3.4 DEEP FOUNDATIONS - SETTLEMENT AND PILE-HEAD DEFLECTIONS OF ACIP PILES

Settlement of the pile-supported structures should be small and tolerable for the anticipated design loads. Based on our analyses, it is estimated that the settlement of a single pile under allowable working loads will be less than about 1 inch. Differential settlements are expected to be half of the total settlement. Lateral deformations at the pile-head were estimated to be in less than 1 inch, based on the performance of lateral load capacity evaluations with the software LPILE under the allowable working loads.

TABLE 2 – AUGER CAST-IN-PLACE PILE DATA TABLE

PILE DIAMETER (IN.)	ALLOWABLE PILE CAPACITIES (TONS)			ANTICIPATED PILE LENGTH BELOW EXISTING GRADES (FEET)	MINIMUM PILE ROCK EMBEDMENT (FEET)	GROUT STRENGTH (PSI)
	COMPRESSION	TENSION	LATERAL			
14	25	10	2	13	5	4,000
16	30	12	3	13	5	4,000
18	35	15	4	13	5	4,000

Note:

1. Pile lengths, tip elevations and allowable capacities shall be re-visited once we have had a chance to review the actual design loads to be provided by the Structural Engineer.
2. UES must review the structural loads, structural drawings, and site plans prior to construction for our recommendations to be valid.
3. The structural engineer is responsible for the structural integrity of the ACIP pile foundations.
4. UES must be present to monitor the installation of all piles to ensure that our recommendations are properly implemented.
5. The minimum top of rock depth should be considered to be 8 feet below existing grades. Minimum rock embedment into the natural limestone formation should be confirmed by the onsite Geotechnical Engineer.

4.3.5 STRUCTURAL FLOOR SLAB

Due to the near coastal setting of the site with the possibility of storm surge, a structural floor system is recommended for the proposed structures which are part of the commercial center. A reinforced floor slab, supported by grade beams, pile caps and the pile foundation system will minimize uplift forces due to storm surge waters compared to a conventional ground supported slab-on-grade. This slab should be designed by the structural engineer of record.

4.4 PAVEMENTS

4.4.1 GENERAL

UES recommends using a flexible pavement section on this project in areas where light autos, pickup trucks and smaller delivery vehicles will travel. Flexible pavements combine the strength and durability of several layer components to produce an appropriate and cost-effective combination of available materials. In the dumpster pad areas and for any tractor trailer delivery, access and pit areas, we recommend using rigid concrete pavement made with Portland cement.

4.4.2 RIGID PAVEMENTS

UES recommends using rigid (concrete) pavement for durability, strength and longer life in the heavy-duty traffic areas and for the truck areas and dumpster pads. Concrete pavement is a rigid pavement resulting in much lighter load transfer to subgrade soils than flexible (asphalt) pavement. Rigid pavement may be constructed of unreinforced Portland cement concrete (Type I) providing a minimum 28-day compressive strength of 4,000 psi. In addition, the concrete should provide a minimum 28-day flexural strength (modulus of rupture) of 600 psi, based on the 3rd point loading of concrete beam samples. Pavement thickness should be 7 inches.

Concrete pavement is a rigid pavement that transfers reduced wheel pressures to the underlying subgrade soils. We recommend constructing a base course and stabilized subgrade beneath concrete pavement. The stabilized subgrade should be at least 4 inches thick, "free-draining", and have a minimum Limerock Bearing Ratio (LBR) value of 40. The base course should be at least 4 inches thick, "free-draining", and have a minimum LBR value of 100.

Control joints for crack control should be closely spaced, between 8 to 12 feet apart. Control joints should be provided in a uniform square or rectangular pattern. The joints should be submitted for review and approved prior to construction. Control joints should be sawed as soon as the concrete can withstand traffic, and concrete surface and aggregate raveling can be prevented.

A critical factor for pavement performance in South Florida is the relationship between the pavement subgrade and the seasonal high groundwater level. It is recommended that the seasonal high groundwater and the bottom of the stabilized subgrade be separated by at least 18 inches.

4.4.3 FLEXIBLE PAVEMENTS

We recommend a three-layer pavement section consisting of stabilized subgrade, base course, and surface course, placed on top of existing subgrade or compacted structural fill. Because traffic loadings are commonly unavailable, we have generalized our pavement design into groups. Table 3: Pavement Component Recommendations shows group descriptions and recommended component thicknesses, referencing structural numbers based on stated estimated daily traffic volume for a 20-year pavement design life. A pavement design should be completed for loading conditions exceeding those described in Table 3.

TABLE 3: PAVEMENT COMPONENT RECOMMENDATIONS				
Traffic Group	**Structural Number**	**Component Thickness (inches)**		
		Stabilized Subgrade	**Limerock Base**	**Asphalt Course**
Parking lots - light duty	2.6	10	6	1.5
Parking lots - heavy duty	3.3	12	8	2.0

Parking lots - light duty: Auto parking areas; over eighty cars; light panel and pickup trucks; average gross weight of 4,000 pounds

Parking lots - heavy duty: Heavy truck traffic and parking; twenty trucks or less per day; average gross vehicle weight of 25,000 pounds

4.4.4 STABILIZED SUBGRADE

We recommend that subgrade materials be compacted in place according to the requirements in the "Site Preparation" section of this report. The stabilized subgrade should be compacted to at least 98 percent of the modified Proctor maximum dry density [American Association of State Highway and Transportation Officials (AASHTO) T-180]. If in situ soils other than limestone are encountered, they should be stabilized properly with limerock or other equivalent materials, and compacted in place according to the requirements in the "Site Preparation" section of this report. The stabilized subgrade materials should achieve a minimum LBR of 40, as specified by Florida Department of Transportation (FDOT) requirements for Type B or Type C Stabilized Subgrade.

The stabilized subgrade can be imported material or a blend of on-site soils and imported materials. If a blend is proposed, we recommend that the contractor perform a mix design to find the optimum mix proportions.

4.4.5 BASE COURSE

UES recommends the base course be either limerock or asphaltic concrete. Limerock should have a minimum LBR of 100. Place limerock in maximum 6-inch lifts and compact each lift to a minimum density of 98 percent of the modified Proctor maximum dry density (AASHTO T-180). The base course can also be an asphaltic concrete material (FDOT specified ABC-3 or equivalent with a minimum Marshall Stability of 1,000 lbs). Perform compliance testing for either limerock or asphaltic concrete at a frequency of one test per 10,000 square feet, or at a minimum of two test locations, whichever is greater.

4.4.6 SURFACE COURSE

In light duty areas where there is occasional truck traffic, but primarily passenger cars, we recommend using an asphaltic concrete, FDOT Type S-III or equivalent, which has a stability of 1,200 pounds. In heavy duty areas, where truck traffic is predominant, we recommend using an asphaltic concrete, FDOT Type S-III or S-I or equivalent, which has a minimum stability of 1,500 pounds.

Asphaltic concrete mixes should be a current FDOT approved design for the materials actually used. Samples of the materials delivered to the project should be tested to verify that the aggregate gradation and asphalt content satisfies the mix design requirements. Compact the asphalt to a minimum of 95 percent of the Marshall design density. After placement and field compaction, core the wearing surface to evaluate material thickness and to perform laboratory densities. Obtain cores at frequencies of at least one core per 3,000 square feet of placed pavement or a minimum of two cores per day's production.

For extended life expectancy of the surface course in parking lots, we recommend applying a coal tar emulsion sealer at least six months after placement of the surface course. The seal coat will help to patch cracks and voids, and protect the surface from damaging ultraviolet light and automobile liquid spillage. Please note that applying the seal coat prior to six months after placement may hinder the "curing" of the surface course, leading to its early deterioration.

4.4.7 EFFECTS OF GROUNDWATER

Adequate separation between the pavement subgrade and the seasonal high groundwater level is critical for long-term pavement performance. Many roadways and parking areas have been destroyed as a result of deterioration of the base and the base/surface course bond. Regardless of the type of pavement base selected, we recommend that the seasonal high groundwater and the bottom of the stabilized subgrade be separated by at least 18 inches.

4.4.8 CURBING

Most pavement curbing is currently extruded curb which lies directly atop of the final asphaltic concrete surface course. Use of extruded curb or elimination of curb entirely, can allow lateral migration of irrigation water from the abutting landscape areas into the base and/or interface between the asphaltic concrete and base. This migration of water may cause base saturation and failure, and/or separation of the asphaltic concrete wearing surface from the base with subsequent rippling and pavement deterioration. For extruded curbing, we recommend that underdrain be installed behind the curb wherever anticipated storm, surface or irrigation waters may collect. In addition, landscape islands should be drained of excess water buildup using an underdrain system.

Alternatively, curbing around any landscaped sections adjacent to the parking lots and driveways could be constructed with full-depth curb sections to reduce horizontal water migration. However, underdrains may still be required dependent upon the soil type and spatial relationships. UES should review final grading plans to evaluate the need and placement of pavement and landscape underdrains.

4.4.9 CONSTRUCTION TRAFFIC

Light duty roadways and incomplete pavement sections will not perform satisfactorily under construction traffic loadings. We recommended that construction traffic (construction equipment, concrete trucks, sod trucks, garbage trucks, moving vans, dump trucks, etc.) be routed away from these roadways or that the pavement section be designed for these loadings.

4.5 SITE PREPARATION

The existing pavement, substructures, and existing utilities scheduled for abandonment should be completely removed by a qualified contractor as per the requirements of an approved demolition plan. The following sections provide site preparation recommendations for utilizing conventional vibratory compaction efforts.

4.5.1 SITE PREPARATION

We recommend normal, good practice site preparation procedures for the building and parking areas. These procedures include: stripping the site of vegetation, asphalt, deleterious material, proof-rolling, and proof-compacting the subgrade, and filling to grade with engineered fill. A general outline of the anticipated earthwork is as follows:

1. If required, perform remedial dewatering prior to any earthwork operations.

2. Prior to construction, any existing underground utility lines within the construction area should be located. Provisions should be made to relocate interfering utilities. Note that if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion which may lead to excessive settlement of overlying structures.

3. The proposed construction limits should be stripped of construction debris, asphalt, and other deleterious materials within and 5 feet beyond the perimeter of the proposed building and pavement areas. Expect clearing and grubbing as much as 12 inches below existing grade.

4. The site should be graded to direct surface water runoff away from the construction areas. Positive drainage must be maintained throughout the design life of the project.

5. After clearing and stripping of the site is completed, the prepared subgrade soils outside the building area should be observed by a qualified geotechnical engineer or his representative to locate any surficial deposits of organic soils, vegetation, excessive roots or debris. Organic soils, vegetation, or deleterious material should be undercut until clean natural soils are encountered, and the resulting excavations backfilled according to the fill placement procedures provided later in this section.

6. Prior to construction of improvement or placement of fill, the subgrade should be compacted using a smooth drum vibratory roller ***in the static mode***, having a minimum static, at-drum weight on the order of 10 tons and a drum diameter on the order of 3 to 4 feet making a minimum of eight overlapping passes with the second set of 4 passes perpendicular to the first set of 4 passes. Typically, the material should exhibit moisture content within +/- 2 percent of the modified Proctor optimum moisture content (ASTM D-1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D-1557) have been uniformly achieved within the upper 12 inches of the compacted natural soil surface.

   Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Compaction should cease if deemed detrimental to adjacent structures and the geotechnical engineer should be contacted immediately. It is recommended that heavy vibratory equipment ***in the vibratory mode*** remain a minimum of 50 feet from existing structures. Within this zone, use of a track-mounted bulldozer, a heavy vibratory roller operating in the static mode, or a smaller vibratory roller is recommended.

7. Place fill material, as required. The fill should consist of sand with less than 10 percent soil fines. Place fill in uniform 10 to 12-inch loose lifts and compact each lift to a minimum density of at least 95 percent of the modified Proctor maximum dry density (ASTM D1557). The last 6 inches of fill beneath pavement areas should be compacted to 98 percent of the modified Proctor maximum dry density. Stabilize this zone with shell or limerock as required to meet the subgrade recommendations contained in the Pavements Section of this report. All fill materials used shall be free of organic materials, roots, vegetation, asphalt, clay or other deleterious materials, and have a maximum particle size less than three (3) inches. Fill material to be placed under the groundwater table (if required) shall consist of FDOT No. 57 stone with a maximum particle size not to exceed 2 inches.

8. Complete in-situ density tests on the subgrade and each lift of fill at a frequency of not less than one test per 2,500 square feet in the building areas and one test per 10,000 square feet in paved areas.

9. If difficult compaction conditions are encountered during the site work operations, the compaction efforts should stop and the geotechnical engineer should be contacted. The geotechnical engineer or his representative should observe proof-rolling of the exposed subgrade to determine if additional compaction is warranted or if any material needs to be over-excavated and replaced.

10. The Contractor is advised that the natural limestone formation may be difficult to excavate, penetrate and/or dewater and may require special equipment to do so.

4.5.2 GROUNDWATER AND SURFACE WATER CONTROL

If site preparation work is performed during the rainy season (May through October), special care should be taken to maintain positive drainage from the building pad and paved areas to drains or ditches around the site. Unexpected wet periods can also occur in Florida during the "dry" season. Such events can raise water tables to levels above seasonal highs without the associated high temperatures to evaporate ponded water. Therefore, the contractor should practice wet weather means and methods for earthwork during the "dry" season as well. Groundwater and surface water control, use of granular fill material and aeration are typical means to accomplish wet weather grading. All fill materials that are excavated from below the water table should be stockpiled for a sufficiently long period to allow drainage.

4.6 CONSTRUCTION CONSIDERATIONS

4.6.1 ACIP PILE INSTALLATION

Recommendations for ACIP pile installation are presented hereafter.

- A minimum center-to-center pile spacing shall be 2.5 times the diameter of the pile.
- A placement tolerance of not more than ¼ inch per foot deviation from the vertical or batter line, with a total deviation of not more than 4 inches at the head of the pile and not more than 2 inches above or below the finished (top) elevation indicated should be required.
- The 28-day compressive strength of the grout used in the piles should be at least 4,000 pounds per square inch (psi).
- In order to provide some assurance that the piles has been constructed with a continuous cross section, a full-length steel reinforcing bar or cage should be installed at the center of each pile immediately after grouting. Centralizers should be attached to individual bars at the bottom and at third points.
- Piles subject to uplift and lateral loading must be provided with adequate reinforcing steel throughout their entire length.
- The installation of adjacent piles located within six (6)-pile diameters of each other within 12 hours from freshly placed grout is not recommended. We recommend that adjacent piles located within six (6)-pile diameters not be installed until the initial grouted pile has set at least 12 hours.
- Place a minimum volume of grout in the hole of at least 115% of the column of the auger hole from the pile tip to the top of the pile. If less than 115% of the theoretical volume of grout is placed in any 5-foot increment, reinstall the pile by advancing the auger 10 feet or to the bottom of the pile if that is less, followed by controlled removal and grout injection.

4.6.2 ACIP PILE DRILLING AND GROUTING

ACIP piles are constructed by rotating a hollow-stem continuous flight auger into the ground until the planned tip depth or termination criterion is achieved. At the termination depth, a grout with high fluidity is pumped under pressure into the hole through the hollow stem auger. As long as pressure is observed in the line, the auger is slowly withdrawn up the hole and the ACIP pile is constructed.

Grout volumes, possibly up to 1.5 to 2 times the theoretical pile volume, may be required for proper pile installation. The minimum grout factor shall be 1.15. No additional compensation shall be provided to The Contractor for grout factors between 1.15 and 1.75. The grout factor is defined as the actual volume of grout pumped into the pile divided by the theoretical volume of the drilled hole.

After achieving the desired depth, a positive grout pressure should be observed prior to initiating withdrawal of the auger. A continuous fluid return consisting of slurry and then grout at the top of the hole is the best indication that the desired pressure head is being achieved. The auger should be withdrawn slowly so that a positive grout pressure is maintained in the hole at all times during auger withdrawal. If the withdrawal of the auger becomes erratic, grout pressure suddenly drops, or if the grout is interrupted, the auger tip should be reinserted at least five (5) feet below the level where the grouting operation was disrupted prior to resuming withdrawal of the auger.

It should be noted that the drilling through the natural limestone formation may be difficult given the strength of the material that was encountered. Refer to the Test Boring Records in Appendix B for information regarding SPT N-values obtained within the natural rock formation.

Some subsidence of fresh grout may occur in the top of the piles. This subsidence is in part a result of the weight of the grout column "pushing" laterally into subsurface material layers. We anticipate that subsidence will occur within a period of approximately two hours following the grouting operation. If subsidence occurs while the pile grout is in a fluid state, we recommend that the pile be immediately filled with fresh grout to the proper cut-off elevation. We recommend that a pile grout subsidence of up to eight (8) inches be considered acceptable. Grout should not be pumped into the piles when it is older than 120 minutes from the time it was batched. Prior to actual installation of the piles, The Contractor should demonstrate that the materials and equipment proposed for use are capable of installing the production piles. The Contractor should provide an accurate method of determining the depth and alignment of the auger during installation.

4.6.3 ACIP PILE INSTALLATION MONITORING

The successful ACIP pile installation will in large part depend upon the expertise of The Contractor and the techniques that are used. Because of the possibility of soil intrusions during auger withdrawal, the job specifications must be carefully prepared and continuous inspections made of the installation. Full-time inspection must be maintained during installation to monitor depths, the number of strokes every five (5) feet of pile length, and the amount of grout pumped versus the rate of auger withdrawal. The full-time monitoring of pile installation will provide a degree of assurance that continuous piles of the proper cross-section are being constructed. Additionally, monitoring of the pile installation will ensure that the proper rock embedment is attained during installation. We recommend that the grout pump be calibrated in the presence of a Geotechnical Engineer prior to initiation of the pile installations. At least one (1) set of 3-inch by 6-inch grout cylinders be made for every 50 cubic yards of pile installation, or fraction thereof, per day.

4.6.4 TEST PILE PROGRAM

Construction documents produced for the project should include provisions for an indicator pile program. The indicator piles should be placed at non-production pile locations and near the exploratory borings so that the drilling characteristics can be directly correlated to known subsurface conditions. The drilling of the indicator piles should be performed under the direct supervision of a Geotechnical Engineer from this office that is familiar with the subsurface conditions encountered at the site. Once final design details are available, The Geotechnical Engineer of Record shall provide recommendations regarding the number, locations and depths of indicator piles for this project. As a minimum, a total of four (4) grouted indicator piles should be installed prior to the start of production pile installation to demonstrate the ACIP pile installation procedures.

We recommend that a test pile program be performed to confirm the length and load carrying capacity of the ACIP piles. As a minimum, we recommend the performance of one (1) fully instrumented compression load test for the ACIP piles. Once final design details have been finalized, the Geotechnical Engineer of Record shall provide recommendations regarding the location and pile length for the load test to be performed as well as the location of strain gauges. The test pile would be loaded to at least twice the design load. Grouted, reinforced piles should be subjected to full scale static compression load test pursuant to the requirements of ASTM D-1143 as well as the Florida Building Code under the direct supervision of a Geotechnical Engineer from our office. It has been widely accepted that piles with compression capacities less than 35 tons do not require a load test. The Owner and Structural Engineer should consult with the local building department to verify that a load test is not required for piles with less than 35 tons of compression capacity.

The purpose of the grouted test piles is to evaluate the load deformation behavior as well as the load distribution of this foundation element as compared to production piles. Therefore, it is imperative that the cut off elevations of the test piles be the same as that of the production piles. Based on the results of the load testing and the installation of the indicator piles, the Geotechnical Engineer would then provide additional installation criteria (i.e. rock socket length, minimum grout factor, revised termination criteria, etc.) for the production piles, if necessary.

We recommend the owner retain UES to perform construction material testing and observations on this project. Field tests and observations could include items such as observation of vibro-replacement operations, load testing as needed, verification of foundation subgrade, monitoring of proof-rolling operations, and performing quality assurance tests on the placement of compacted structural fill.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

4.7 CONSTRUCTION RELATED SERVICES

We recommend the owner retain UES to perform construction material testing and observations on this project. Field tests and observations could include items such as verification of foundation subgrade by cone penetration testing, monitoring of proof-rolling operations, pile installation, load test monitoring, and performing quality assurance tests on the placement of compacted structural fill.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

5.0 LIMITATIONS

The test borings completed for this report were widely spaced and are not considered sufficient for reliably detecting the presence of isolated, anomalous surface or subsurface conditions, or reliably estimating unsuitable or suitable material quantities. Accordingly, UES does not recommend relying on our boring information to negate the presence of anomalous materials or for estimation of material quantities. Therefore, UES will not be responsible for any extrapolation or use of our data by others beyond the purpose(s) for which it is applicable or intended. Observation, testing and inspections during earthwork and foundation installation are an extension of the design process. We cannot be held responsible or liable for foundation systems or other recommendations contained in this report if we are not engaged to provide additional consultation during design development and construction.

During the early stages of this construction, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An (ASFE) publication, "Important Information About Your Geotechnical Engineering Report" appears in Appendix C, and will help explain the nature of geotechnical issues.

Further, we present documents in Appendix C: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

6.0 SUMMARY

In summary, we understand that the project consists of constructing a retail store with a building footprint of 6,000 square-feet, and a restaurant with a building footprint of 3,116 square-feet with associated paved parking and drainage improvements, Key Largo, Monroe County, Florida. Limited field and laboratory tests have been performed to provide geotechnical engineering recommendations for foundation design, pavement design, and site preparation.

The soils encountered generally consist of light brown, dense to very dense, slightly silty, fine to medium sand and limerock fragments (FILL; SP-SM) to average depths of about 8 feet below land surface (bls). Below, a layer of light brown sandy limestone (KEY LARGO LIMESTONE FORMATION) was encountered to the maximum explored depths of 15 feet bls.

Groundwater was measured at depths ranging from 8 to 8.3 feet below the existing land surface in the test borings. A reasonable estimate for an average wet seasonal high groundwater table is approximately 6 feet below land surface (bls).

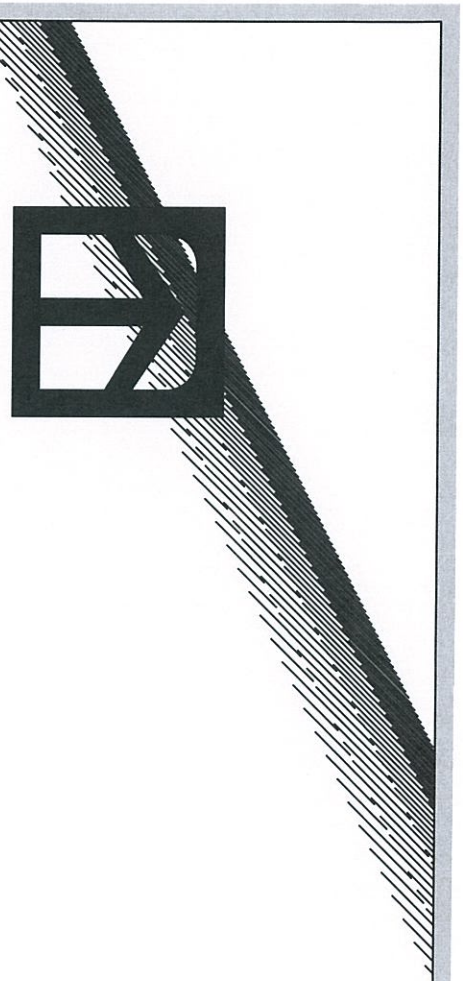
Estimates of allowable pile capacities and settlement for the proposed structures are covered in detail within the body of this report. The proposed retail and restaurant structures may be supported with 14 to 18-inch diameter auger-cast piles.

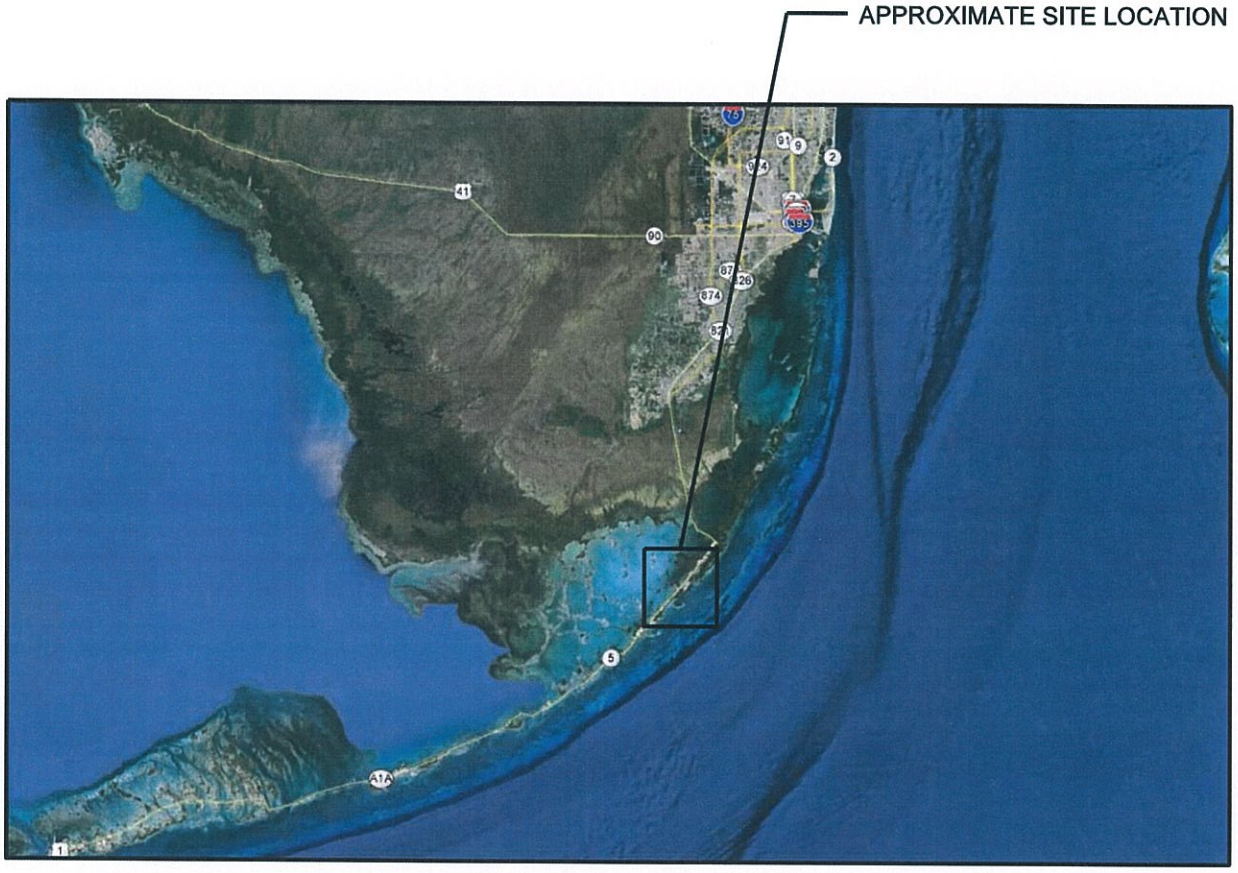
Pavements should be designed as a function of anticipated traffic loadings. We recommend using a rigid concrete pavement in the dumpster pad locations and a three-layer pavement section consisting of stabilized subgrade, base course, and a surface course in other areas. All pavement designs should incorporate the effects of groundwater, irrigated landscape areas, and construction traffic.

We note that since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations, grade alterations, and actual structural loads applied, UES must review the preliminary and final site and grading plans, and structural design loads to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

UES recommends normal, good practice site preparation procedures to prepare the subgrade to support the structure and pavements.

APPENDIX A





SITE VICINITY MAP

COUNTY: MONROE, FLORIDA

REFERENCE: GOOGLE EARTH, 2015

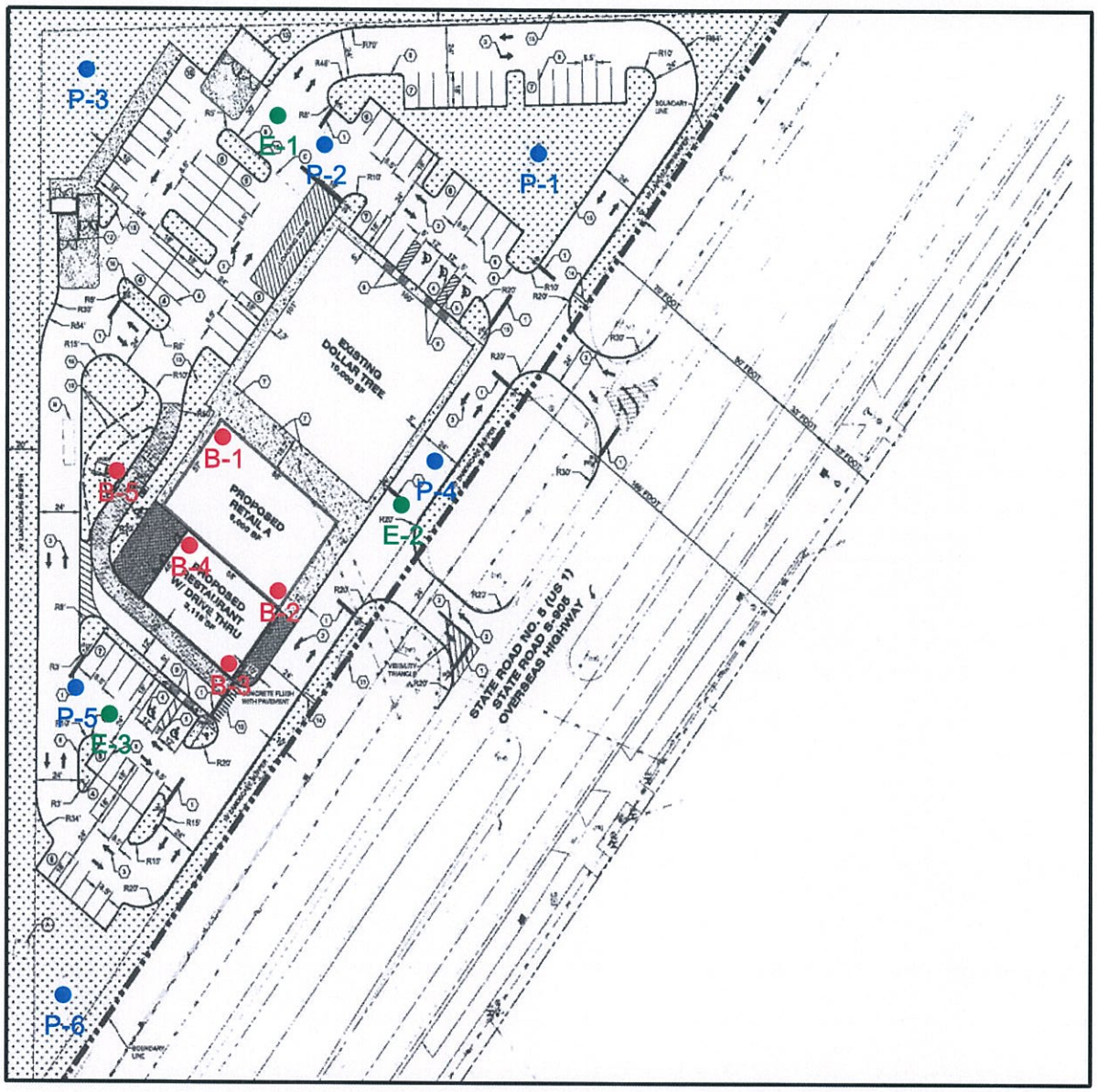
DATE: NOVEMBER, 2015

SITE VICINITY MAP

KEY LARGO COMMERCIAL CENTER
101000 OVERSEAS HIGHWAY
KEY LARGO, FL

DRAWN	SCALE	PROJ. No.
SJ	N.T.S.	2130.1500074
CHECKED	DATE	
RV	NOVEMBER, 2015	SHEET A-1

APPENDIX B



TEST LOCATION PLAN

LEGEND

- APPROXIMATE SPT BORING LOCATION FOR STRUCTURES
- APPROXIMATE SPT BORING LOCATION FOR PAVEMENT
- APPROXIMATE EXFILTRATION TEST LOCATION

TEST LOCATION PLAN

KEY LARGO COMMERCIAL CENTER
101000 OVERSEAS HIGHWAY
KEY LARGO, FL

DRAWN	SCALE	PROJ. No.
SJ	N.T.S.	2130.1500074
CHECKED	DATE	
RV	NOV., 2015	SHEET B-1

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
PAGE:	1

PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **B-1** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): 8.0 CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		36-20-16-11	36										
		8-10-10-12	20										
5													
		16-16-22-19	38										
		33-22-18-14	40	▼									
						Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)							
10		19-17-14-10	31										
15		18-20-22-21	42			SPT Boring Terminated at Depth of 15 feet. Borehole Backfilled.							

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PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **B-2** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): 8.1 CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		6-12-12-36	24										
		22-28-50/3"	78/9"										
5													
		29-42-50-50	92										
		41-25-37-29	62	▼		Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)							
10		19-18-22-17	40										
15		20-29-50/4"	79/10"			SPT Boring Terminated at Depth of 15 feet. Borehole Backfilled.							

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BORING LOGS

PROJECT NO.:	2130.1500074.000
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **B-3** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): 8.3 CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		41-48-29-19	77										
		18-22-26-31	48										
5													
		24-30-42-51	72										
		40-49-50-50/2"	99	▼		Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)							
10		40-22-19-17	41										
15		29-47-50/4"	97/10"			SPT Boring Terminated at Depth of 15 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **B-4** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): 8.1 CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		28-14-17-18	31										
		12-18-16-35	34										
5													
		40-50/4"	50/4"										
		29-31-40-28	71	▼		Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)							
10		20-26-29-26	55										
15		17-20-24-27	44			SPT Boring Terminated at Depth of 15 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **B-5** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): 8.1 CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		14-8-50/5"	58/11"										
		42-47-50/5"	97/11"										
5													
		37-42-40-39	82										
		36-40-42-19	82	▼		Light Brown Sandy LIMESTONE (KEY LARGO LIMESTONE FORMATION)							
10		20-20-22-26	42										
15		14-22-28-31	50			SPT Boring Terminated at Depth of 15 feet. Borehole Backfilled.							

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BORING LOGS

PROJECT NO.:	2130.1500074.000
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **P-1** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): GNE CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		12-5-35-50/2"	40										
		50/3"	50/3"										
5													
		50/3"	50/3"										
						SPT Boring Terminated at Depth of 6 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
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PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **P-2** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): GNE CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA			
										REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		40-27-23-16	50										
		29-41-50/5"	91/11"										
5													
		50/5"	50/5"										
						SPT Boring Terminated at Depth of 6 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
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PROJECT NO.:	2130.1500074.000
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PROJECT: Key Largo Commercial Center
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CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **P-3** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): GNE CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA			
										REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		29-23-10-10	33										
		5-3-3-4	6										
5													
		18-11-13-30	24										
						SPT Boring Terminated at Depth of 6 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
PAGE:	9

PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **P-4** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): GNE CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		36-19-44-49	63										
		50/4"	50/4"										
5													
		50/3"	50/3"										
						SPT Boring Terminated at Depth of 6 feet. Borehole Backfilled.							

UNIVERSAL ENGINEERING SCIENCES
BORING LOGS

PROJECT NO.:	2130.1500074.000
REPORT NO.:	G00157
PAGE:	10

PROJECT: Key Largo Commercial Center
1010000 Overseas Highway
Key Largo, FL

CLIENT: Beach Holding, Inc.

LOCATION: 1010000 Overseas Highway

REMARKS: B-57 (Automatic Hammer)

BORING DESIGNATION: **P-5** SHEET: **1 of 1**

NORTHING (ft): EASTING (ft):

G.S. ELEVATION (ft): N/A SPT DATE: 10/31/15

WATER TABLE (ft): GNE CORING DATE: 10/31/15

DATE OF READING: 10/31/2015 DRILLED BY: LT

EST. W.S.W.T. (ft): TYPE OF SAMPLING: SPT

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ORG. CONTENT (%)	ROCK CORING DATA			
										REC (%)	RQD (%)	DOWN PRESSURE (PSI)	TIME (s.)
0						1" Asphalt Pavement							
						Light Brown Slightly Silty Fine to Medium SAND and Limerock Fragments (FILL; SP-SM)							
		16-29-41-46	70										
		40-29-42-50	71										
5													
		50/5"	50/5"			SPT Boring Terminated at Depth of 6 feet. Borehole Backfilled.							

NOTES RELATED TO BORING LOGS

General Notes

- The Groundwater level was encountered and recorded (if shown) following the completion of the soil test borings on the date indicated. Fluctuations in groundwater levels are common; refer to report text for a discussion.
- The boring location on land was identified in the field utilizing standard taping procedures and existing land marks.
- The Boring Logs represent our interpretation of field conditions based on engineering examination of the soil/rock samples.
- The Boring Logs are subject to limitations, conclusions and recommendations presented in the report text.
- The N-values shown in the Boring Logs indicated as 50/1" refers to the Standard Penetration Test (SPT) and means 50 blows per 1 inch of sampler penetration. The SPT uses a 140-pound hammer falling 30 inches (ASTM D-1583).
- The N-value from the SPT is the sum of the hammer blows required to drive the sampler the second and third 6-inch increments.
- The soil/rock strata interfaces shown on the Boring Logs are approximate and may vary from those shown. The soil/rock conditions shown on the Boring Logs refer to conditions at the specific location tested; soil/rock conditions may vary between test locations.
- W.O.H. denotes fell under weight of hammer.

General Descriptors

- The grain-size descriptions are as follows:

Name	Size Limits
Boulder	12 inches or more
Cobbles	3 to 12 inches
Coarse Gravel	¾ to 3 inches
Fine Gravel	No. 4 sieve to ¾ inch
Coarse Sand	No. 10 to No. 4 sieve
Medium Sand	No. 40 to No. 10 sieve
Fine Sand	No. 200 to No. 40 sieve
Fines	Smaller than No. 200 sieve

- Definitions related to adjectives used in soil/rock descriptions:

Proportion	Adjective
About 0 to 10 %	trace
About 10% to 25%	little
About 25% to 35%	some
About 35% to 50%	and

NOTES RELATED TO BORING LOGS

- Relative density of sands/gravels and consistency of silts/clays:

Granular Soils		
Relative Density	**Safety Hammer SPT (Blows/Foot)**	**Automatic Hammer SPT (Blows/Foot)**
Very Loose	0-4	0-3
Loose	4-10	3-8
Medium Dense	10-30	8-24
Dense	30-50	24-40
Very Dense	Greater than 50	Greater than 40
Silts and Clays		
Consistency	**Safety Hammer SPT (Blows/Foot)**	**Automatic Hammer SPT (Blows/Foot)**
Very Soft	0-2	0-1
Soft	3-4	1-3
Firm	5-8	3-6
Stiff	9-15	6-12
Very Stiff	16-30	12-24
Hard	Greater than 30	Greater than 24

- Boring Log Symbols

Split spoon sample

Rock core specimen

Groundwater table

NOTES RELATED TO BORING LOGS

Soil Classification Chart

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

USCS LEGEND 7/18/14

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

TABLE 1 - SUMMARY OF CONSTANT HEAD EXFILTRATION TEST RESULTS

KEY LARGO COMMERCIAL CENTER
1010000 OVERSEAS HIGHWAY
KEY LARGO, FL
MONROE COUNTY
UES PROJECT NO. 2130.1500074
UES REPORT NO. G00157

Test No.	Date Performed	Diameter		Depth of Hole (Feet)	Depth to Groundwater Level Below Ground Surface (Feet)		SATURATED HOLE DEPTH Ds (Feet)	Corrected Depth of Hole (Feet)	Average Flow Rate (gpm)	K, Hydraulic Conductivity (cfs/ft^2-Ft Head)
		Casing (Inches)	Hole (Inches)		Prior to Test	During Test				
E-1	10/31/2015	3	4	15	8.1	0.00	6.90	15.00	18.0	5.72E-04
E-2	10/31/2015	3	4	15	7.7	0.00	7.30	15.00	20.0	6.57E-04
E-3	10/31/2015	3	4	15	8.1	0.00	6.90	15.00	20.0	6.36E-04

NOTES:

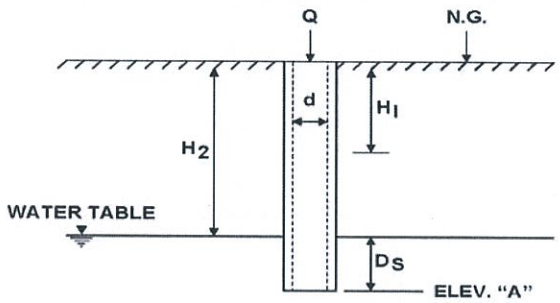
(1) The above hydraulic conductivity values are for a French drain installed to the same depth as the borehole tests. The values represent an ultimate value. The designer should decide on the required factor of safety.

(2) The hydraulic conductivity values were calculated based on the South Florida Water Management Districts's USUAL OPEN HOLE CONSTANT HEAD exfiltration test procedure as shown on the following page.

(3) The diameter of the CASING was used in the computation of the hydraulic conductivity values presented in the above table.

Test No.	DEPTH (FEET) FROM	TO	GENERAL MATERIAL DESCRIPTION
E-1	0	1"	Asphalt Pavement
	1"	8	Light Brown Slightly Silty Fine to Medium SAND with Limerock Fragments (FILL; SP-SM)
	8	15	Light Brown Sandy LIMESTONE (KEY LARGO FORMATION)
E-2	0	1"	Asphalt Pavement
	1"	8	Light Brown Slightly Silty Fine to Medium SAND with Limerock Fragments (FILL; SP-SM)
	8	15	Light Brown Sandy LIMESTONE (KEY LARGO FORMATION)
E-3	0	1"	Asphalt Pavement
	1"	8	Light Brown Slightly Silty Fine to Medium SAND with Limerock Fragments (FILL; SP-SM)
	8	15	Light Brown Sandy LIMESTONE (KEY LARGO FORMATION)

SCHEMATICS OF SFWMD USUAL OPEN-HOLE TEST PROCEDURES



$$K = \frac{4Q}{\pi d (2H_2^2 + 4H_2D_S + H_2d)}$$

K= HYDRAULIC CONDUCTIVITY (CFS/FT.^{2} - FT.HEAD)

Q= "STABILIZED" FLOW RATE (CFS)

d= DIAMETER OF TEST HOLE (FEET)

H_2 = DEPTH TO WATER TABLE (FEET)

D_S = SATURATED HOLE DEPTH (FEET)

ELEV. "A"= PROPOSED TRENCH BOTTOM ELEV.

H_1 = AVERAGE HEAD ON UNSATURATED HOLE SURFACE (FT.HEAD)

APPENDIX C

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/ or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

CONSTRAINTS AND RESTRICTIONS

WARRANTY

UES has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and UES of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of UES to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

UES is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of UES.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by UES.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations. Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. UES cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

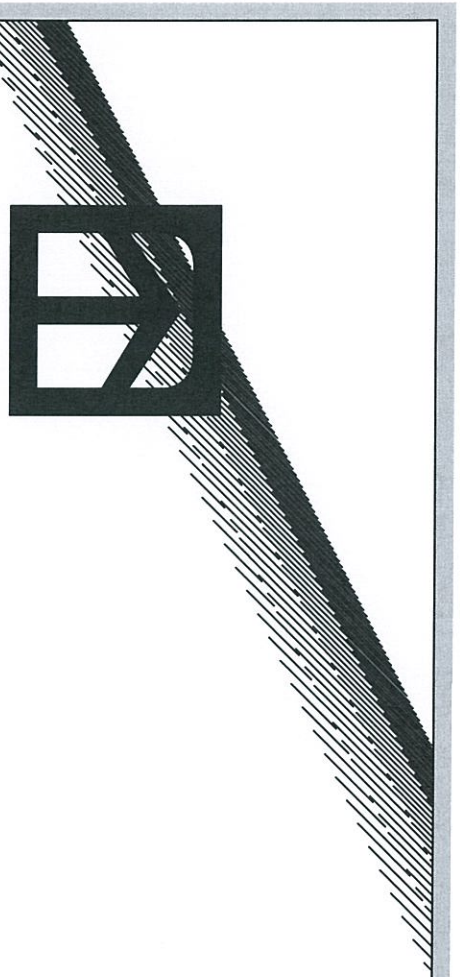
LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for UES to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by UES to locate any such buried objects. UES cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of investigation. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

APPENDIX D



Universal Engineering Sciences, Inc.
GENERAL CONDITIONS

SECTION 1: RESPONSIBILITIES

1.1 *Universal Engineering Sciences, Inc.*, ("UES"), has the responsibility for providing the services described under the Scope of Services section. The work is to be performed according to accepted standards of care and is to be completed in a timely manner. The term "UES" as used herein includes all of *Universal Engineering Sciences, Inc's* agents, employees, professional staff, and subcontractors.

1.2 The Client or a duly authorized representative is responsible for providing UES with a clear understanding of the project nature and scope. The Client shall supply UES with sufficient and adequate information, including, but not limited to, maps, site plans, reports, surveys and designs, to allow UES to properly complete the specified services. The Client shall also communicate changes in the nature and scope of the project as soon as possible during performance of the work so that the changes can be incorporated into the work product.

1.3 The Client acknowledges that UES's responsibilities in providing the services described under the Scope of Services section is limited to those services described therein, and the Client hereby assumes any collateral or affiliated duties necessitated by or for those services. Such duties may include, but are not limited to, reporting requirements imposed by any third party such as federal, state, or local entities, the provision of any required notices to any third party, or the securing of necessary permits or permissions from any third parties required for UES's provision of the services so described, unless otherwise agreed upon by both parties.

1.4 **PURSUANT TO FLORIDA STATUTES §558.0035, ANY INDIVIDUAL EMPLOYEE OR AGENT OF UES MAY NOT BE HELD INDIVIDUALLY LIABLE FOR NEGLIGENCE.**

SECTION 2: STANDARD OF CARE

2.1 Services performed by UES under this Agreement will be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of UES's profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty, express or implied, is made.

2.2 The Client recognizes that subsurface conditions may vary from those observed at locations where borings, surveys, or other explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by UES will be based solely on information available to UES at the time of service. UES is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed.

2.3 Execution of this document by UES is not a representation that UES has visited the site, become generally familiar with local conditions under which the services are to be performed, or correlated personal observations with the requirements of the Scope of Services. It is the Client's responsibility to provide UES with all information necessary for UES to provide the services described under the Scope of Services, and the Client assumes all liability for information not provided to UES that may affect the quality or sufficiency of the services so described.

2.4 Should UES be retained to provide threshold inspection services under Florida Statutes §553.79, Client acknowledges that UES's services thereunder do not constitute a guarantee that the construction in question has been properly designed or constructed, and UES's services do not replace any of the obligations or liabilities associated with any architect, contractor, or structural engineer. Therefore it is explicitly agreed that the Client will not hold UES responsible for the proper performance of service by any architect, contractor, structural engineer or any other entity associated with the project.

SECTION 3: SITE ACCESS AND SITE CONDITIONS

3.1 Client will grant or obtain free access to the site for all equipment and personnel necessary for UES to perform the work set forth in this Agreement. The Client will notify any and all possessors of the project site that Client has granted UES free access to the site. UES will take reasonable precautions to minimize damage to the site, but it is understood by Client that, in the normal course of work, some damage may occur, and the correction of such damage is not part of this Agreement unless so specified in the Proposal.

3.2 The Client is responsible for the accuracy of locations for all subterranean structures and utilities. UES will take reasonable precautions to avoid known subterranean structures, and the Client waives any claim against UES, and agrees to defend, indemnify, and hold UES harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, Client agrees to compensate UES for any time spent or expenses incurred by UES in defense of any such claim with compensation to be based upon UES's prevailing fee schedule and expense reimbursement policy.

SECTION 4: SAMPLE OWNERSHIP AND DISPOSAL

4.1 Soil or water samples obtained from the project during performance of the work shall remain the property of the Client.

4.2 UES will dispose of or return to Client all remaining soils and rock samples 60 days after submission of report covering those samples. Further storage or transfer of samples can be made at Client's expense upon Client's prior written request.

4.3 Samples which are contaminated by petroleum products or other chemical waste will be returned to Client for treatment or disposal, consistent with all appropriate federal, state, or local regulations.

SECTION 5: BILLING AND PAYMENT

5.1 UES will submit invoices to Client monthly or upon completion of services. Invoices will show charges for different personnel and expense classifications.

5.2 Payment is due 30 days after presentation of invoice and is past due 31 days from invoice date. Client agrees to pay a finance charge of one and one-half percent (1 ½ %) per month, or the maximum rate allowed by law, on past due accounts.

5.3 If UES incurs any expenses to collect overdue billings on invoices, the sums paid by UES for reasonable attorneys' fees, court costs, UES's time, UES's expenses, and interest will be due and owing by the Client.

SECTION 6: OWNERSHIP AND USE OF DOCUMENTS

6.1 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, as instruments of service, shall remain the property of UES.

6.2 Client agrees that all reports and other work furnished to the Client or his agents, which are not paid for, will be returned upon demand and will not be used by the Client for any purpose.

6.3 UES will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to the Client at all reasonable times.

6.4 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by UES, are prepared for the sole and exclusive use of Client, and may not be given to any other party or used or relied upon by any such party without the express written consent of UES.

SECTION 7: DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS

7.1 Client warrants that a reasonable effort has been made to inform UES of known or suspected hazardous materials on or near the project site.

7.2 Under this agreement, the term hazardous materials include hazardous materials (40 CFR 172.01), hazardous wastes (40 CFR 261.2), hazardous substances (40 CFR 300.6), petroleum products, polychlorinated biphenyls, and asbestos.

7.3 Hazardous materials may exist at a site where there is no reason to believe they could or should be present. UES and Client agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work. UES and Client also agree that the discovery of unanticipated hazardous materials may make it necessary for UES to take immediate measures to protect health and safety. Client agrees to compensate UES for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous waste.

7.4 UES agrees to notify Client when unanticipated hazardous materials or suspected hazardous materials are encountered. Client agrees to make any disclosures required by law to the appropriate governing agencies. Client also agrees to hold UES harmless for any and all consequences of disclosures made by UES which are required by governing law. In the event the project site is not owned by Client, Client recognizes that it is the Client's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

7.5 Notwithstanding any other provision of the Agreement, Client waives any claim against UES, and to the maximum extent permitted by law, agrees to defend, indemnify, and save UES harmless from any claim, liability, and/or defense costs for injury or loss arising from UES's discovery of unanticipated hazardous materials or suspected hazardous materials including any costs created by delay of the project and any cost associated with possible reduction of the property's value. Client will be responsible for ultimate disposal of any samples secured by UES which are found to be contaminated.

SECTION 8: RISK ALLOCATION

8.1 Client agrees that UES's liability for any damage on account of any breach of contract, error, omission or other professional negligence will be limited to a sum not to exceed $50,000 or UES's fee, whichever is greater. If Client prefers to have higher limits on contractual or professional liability, UES agrees to increase the limits up to a maximum of $1,000,000.00 upon Client's written request at the time of accepting our proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $400.00, whichever is greater. The additional charge for the higher liability limits is because of the greater risk assumed and is not strictly a charge for additional professional liability insurance.

SECTION 9: INSURANCE

9.1 UES represents and warrants that it and its agents, staff and consultants employed by it, is and are protected by worker's compensation insurance and that UES has such coverage under public liability and property damage insurance policies which UES deems to be adequate. Certificates for all such policies of insurance shall be provided to Client upon request in writing. Within the limits and conditions of such insurance, UES agrees to indemnify and save Client harmless from and against loss, damage, or liability arising from negligent acts by UES, its agents, staff, and consultants employed by it. UES shall not be responsible for any loss, damage or liability beyond the amounts, limits, and conditions of such insurance or the limits described in Section 8, whichever is less. The Client agrees to defend, indemnify and save UES harmless for loss, damage or liability arising from acts by Client, Client's agent, staff, and other UESs employed by Client.

SECTION 10: DISPUTE RESOLUTION

10.1 All claims, disputes, and other matters in controversy between UES and Client arising out of or in any way related to this Agreement will be submitted to alternative dispute resolution (ADR) such as mediation or arbitration, before and as a condition precedent to other remedies provided by law, including the commencement of litigation.

10.2 If a dispute arises related to the services provided under this Agreement and that dispute requires litigation instead of ADR as provided above, then:

(a) the claim will be brought and tried in judicial jurisdiction of the court of the county where UES's principal place of business is located and Client waives the right to remove the action to any other county or judicial jurisdiction, and

(b) The prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorneys' fees, and other claim related expenses.

SECTION 11: TERMINATION

11.1 This agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event of termination, UES shall be paid for services performed to the termination notice date plus reasonable termination expenses.

11.2 In the event of termination, or suspension for more than three (3) months, prior to completion of all reports contemplated by the Agreement, UES may complete such analyses and records as are necessary to complete its files and may also complete a report on the services performed to the date of notice of termination or suspension. The expense of termination or suspension shall include all direct costs of UES in completing such analyses, records and reports.

SECTION 12: ASSIGNS

12.1 Neither the Client nor UES may delegate, assign, sublet or transfer their duties or interest in this Agreement without the written consent of the other party.

SECTION 13. GOVERNING LAW AND SURVIVAL

13.1 The laws of the State of Florida will govern the validity of these Terms, their interpretation and performance.

13.2 If any of the provisions contained in this Agreement are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this Agreement for any cause.

SECTION 14. INTEGRATION CLAUSE

14.1 This Agreement represents and contains the entire and only agreement and understanding among the parties with respect to the subject matter of this Agreement, and supersedes any and all prior and contemporaneous oral and written agreements, understandings, representations, inducements, promises, warranties, and conditions among the parties. No agreement, understanding, representation, inducement, promise, warranty, or condition of any kind with respect to the subject matter of this Agreement shall be relied upon by the parties unless expressly incorporated herein.

14.2 This Agreement may not be amended or modified except by an agreement in writing signed by the party against whom the enforcement of any modification or amendment is sought.