Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

June 6, 2012

Millhaven Plantation, LLC
P.O. Box 2303
Monroe, Louisiana 71207

Attention: Ms. Rebecca Harrod

Reference: Preliminary Subsurface Information
Project Arthur-Millhaven Site
AAI Project No.: 113-12-94-8617
Shreveport File No.: 12.94.080

Dear Ms. Harrod:

Ardaman and Associates, Inc. (AAI) has completed field work at the above referenced site. Laboratory analyses of samples obtained from the test borings are in process and we anticipate a complete report will be issued in the near future. Based on our visual examination of the samples, our field testing results, and our prior experience near this site, we are providing this preliminary information to assist you in evaluating the property's feasibility for development.

Please don't hesitate to contact this office should you have questions or need additional information.

Respectfully submitted,

James M. Belt, P.E.
Branch Manager
Shreveport Area Operations

STATE OF LOUISIANA
JAMES M. BELT
REG. No. 27126
PROFESSIONAL ENGINEER
6/6/12
IN
CIVIL ENGINEERING

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Mailing Address: PO Box 19220, Shreveport, Louisiana 71149-0220
Louisiana: Alexandria, Baton Rouge, Monroe, New Orleans, Shreveport
Florida: Bartow, Cocoa, Fort Myers, Miami, Orlando, Port St. Lucie, Sarasota, Tallahassee, Tampa, West Palm Beach

PROJECT ARTHUR
MILLHAVEN PLANTATION SITE
OUACHITA PARISH, LOUISIANA

SOIL CONDITIONS

AAI completed twenty-five (25) test borings at this site between May 23rd and May 29th 2012. The borings were taken on a grid of about 1,000 feet by 1,100 feet, more or less. The soils generally encountered within the upper four (4) feet are moderately plastic medium stiff, lean clays (USCS Classification CL). Below this depth, medium stiff highly plastic fat clay was generally encountered. Below forty (40) feet, medium dense to dense silty sand (SM) was encountered to the depth explored.

SUBGRADE PREPARATION

Prior to subsequent construction activity, surficial vegetation, stumps and any remaining trees should be removed and wasted. Top soil at this site is primarily low plasticity, very fine silty loam. Stripping on the order of six (6) inches or less is anticipated over most of the site. However, additional excavation and backfill may be required if undetected weak spots are encountered during the stripping operation. Provide drainage of the exposed subgrade by sloping grades and ditching away from the construction site.

After stripping, the exposed surface of areas where structures, paving or fill are to be placed should be scarified to a minimum of twelve (12) inches, the moisture content adjusted to within one (1) percent below to three (3) percent above optimum and recompacted to ninety-five (95) percent of the laboratory maximum as determined by ASTM D698 (Standard Proctor Test) prior to placement of any fill or base materials.

FILL RECOMMENDATIONS

Where fill materials may be required to achieve the desired finished grade elevation or to establish positive drainage, the material should be placed in controlled lifts. Lifts should be placed in thin horizontal layers not exceeding eight (8) inches compacted thickness. All imported structural fill material should be "select". Select materials classify SC or CL (clayey sand or sandy lean clay) in accordance with the Unified Soils Classification System (USCS) and will

have liquid limits no greater than thirty-eight (38), plasticity indices (PI) between eight (8) and eighteen (18), and no more than sixty (60) percent passing the U.S. Standard No. 200 Sieve.

Each lift of select fill should be moisture conditioned to within two (2) percentage points of optimum moisture and compacted to a minimum of ninety-five (95) percent of the laboratory maximum as determined by ASTM D698. Typical specifications for compaction of sandy clay and clayey sand soils are attached. Onsite soils classifying CL, SM, or SC are suitable for use as fill with adequate moisture conditioning, processing and compaction.

PRELIMINARY FOUNDATION RECOMMENDATIONS

The (CL) soils encountered on the surface of this site are generally considered to have slight potential for volumetric instability with changes in moisture content and are of fair bearing quality. We would anticipate a minimum of (1) to (2) feet of fill would be required to establish positive drainage around any building pads. With attention to footing placement depth and slab design, lightly loaded structures can be supported on shallow foundation systems on the site.

Heavily loaded structures will likely require support from a deep foundation system to minimize differential consolidation settlement in the medium stiff clays encountered at this site.

Shallow Foundations - Stiffened, monolithic slab/foundation slab-on-grade designs such as post-tensioned or rebar reinforced ribbed slabs are better suited to the soil conditions encountered for support of light to moderately loaded structures. However, where fill depths will be such a minimum of four (4) feet of select fill or native CL soil can be maintained between the bottom of foundations and the underlying CH soil (6 feet between the bottom of slabs and the CH soil), conventional continuous and isolated spread footings can be used.

The base of the footings (or turned down slabs) can be placed approximately two (2) feet below finished floor elevations in the prepared sandy lean clay or in density controlled fill. Continuous (strip) footings can be proportioned for an allowable bearing pressure of 1,500 PSF. A minimum footing width of eighteen (18) inches should be maintained for all continuous footings.

Areas of concentrated load can be supported by isolated spread (spot) footings. The base of the footings should be placed on the previously described stratum. An allowable bearing pressure of 2,000 PSF can be used to proportion all spread footings. A minimum footing width of twenty-four

(24) inches should be maintained for all spread footings. The bearing pressures provided above contain a minimum factor of safety of two (2) against shear failure of the bearing stratum and were selected to limit settlement potential to an inch or less.

The slabs for proposed structures can be placed directly on the density controlled fill or prepared subgrade. A Modulus of Subgrade Reaction (k_s) of 150 PCI be used for the prepared lean clay subgrade or density controlled select fill. Use of a polyethylene moisture (vapor) barrier is recommended under all climate controlled areas. It is recommended the slab be structurally tied to the foundation.

Deep Foundations – The use of drilled shafts, augured-cast-in-place (ACIP) piles, and all types of driven piles are feasible at this site. Straight sided shafts installed to tip depth of less than thirty-five (35) feet are feasible to support moderately heavy loads. ACIP piles and driven piles will be most suitable to support heavy vertical loading or loading with a significant lateral component.

LOG OF BORING NO. B-1

PROJECT: Project Arthur-Millhaven

SHEET 1 of 1

CLIENT: Millhaven Plantation LLC

LOCATION: Ouachita Parish, Louisiana

DATE: 5/23/12

SURFACE ELEV:

DRILLING METHOD(S): 0 - 25 feet Auger 25- 50 feet Rotary Wash

GROUNDWATER INFORMATION: Water encountered at eighteen (18) feet depth

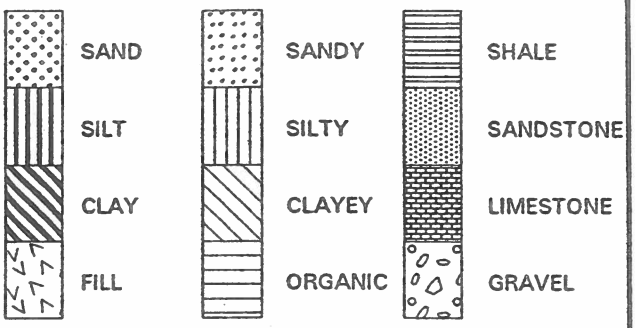
FIELD DATA				LABORATORY DATA									
SOIL & ROCK SYMBOL	DEPTH (FT)	SAMPLE TYPE	N: SPT, BLOWS/FT T: THD, BLOWS/FT P: HAND PEN, TSF	MOISTURE CONTENT, %	DRY DENSITY POUNDS/CU.FT	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	MINUS NO. 200 SIEVE, %	COMPRESSIVE STRENGTH, KSF	FAILURE STRAIN (%)	CONFINING PRESSURE PSI	DESCRIPTION OF STRATUM
			N = 9	14					92				Medium tan silty clay with trace sand
			N = 7	21		40	20	20					--Brownish gray 4.0
	5		P = 3.0	29	92	69	28	41		1.84	2.0		Medium brown clay
			P = 1.5	41									
	10		P = 2.2	35	86	79	31	48		1.10	1.0		--Reddish brown with calcium nodules 13.0
	15		P = 1.5	24									Medium light brown sandy silty clay 18.0
	20		P = 1.2	29	95					1.37	1.6		Medium brownish gray clay
	25		P = 1.2	28					94				--Gray with trace fine sand
	30		N = 13	25									
	35		N = 18	36		61	25	36	87				--Stiff 38.0
	40		N = 28	23					41				Medium dense tan silty fine sand 43.0
	45		N = 21	22					6				Medium dense tan sand with silt and trace fine gravel
	50		N = 34	24									--Dense 50.0
	55												Bottom of boring at 50 feet

TUBE SAMPLE | AUGER SAMPLE | SPLIT-SPOON | ROCK CORE | THD CONE PEN. | NO RECOVERY

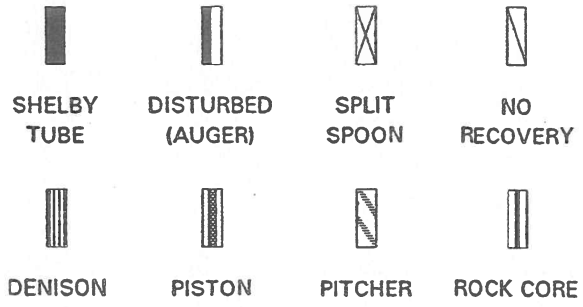
REMARKS:

KEY TO SOIL CLASSIFICATION TERMS AND SYMBOLS

SOIL OR ROCK TYPES



SAMPLER TYPES



CONSISTENCY OF COHESIVE SOILS (MAJOR PORTION PASSING NO. 200 SIEVE)

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH, TONS/SQ FT
VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.5
FIRM	0.5 TO 1.0
STIFF	1.0 TO 2.0
VERY STIFF	2.0 TO 4.0
HARD	GREATER THAN 4.0

RELATIVE DENSITY OF GRANULAR SOILS (MAJOR PORTION RETAINED ON NO. 200 SIEVE)

DESCRIPTIVE TERM	RELATIVE DENSITY, %
VERY LOOSE	LESS THAN 15
LOOSE	15 TO 35
MEDIUM DENSE	35 TO 65
DENSE	65 TO 85
VERY DENSE	GREATER THAN 85

WATER LEVELS

▼ - DEPTH GROUNDWATER FIRST ENCOUNTERED DURING DRILLING

▽ - GROUNDWATER LEVEL AFTER 24 HOURS (UNLESS OTHERWISE NOTED)

TERMS DESCRIBING SOIL STRUCTURE

Parting: paper thin in thickness

Seam: 1/8" - 3" in thickness

Layer: greater than 3" in thickness

Calcareous: containing appreciable quanties of calcium carbonate

Ferrous: containing appreciable quantities of iron

Well-graded: having wide range in grain size & similar proportions of all intermediate sizes

Poorly graded: predominately one grain size or having a range of sizes with few or no particles of some intermediate sizes

Fissured: containing shrinkage cracks, frequently filled with fine sand or silt, usually more or less vertical

Interbedded: composed of alternate layers of different soil types

Laminated: composed of thin layers of varying color and texture

Slickensided: having inclined planes of weakness that are slick & glossy in appearance

NOTE: Clays possessing slickensided or fissured structure may exhibit lower measured shear strength than indicated by the described consistency. The consistency of such soil is interpreted using the measured shear strength along with pocket penetrometer results.