

EXHIBIT N

SUBSOIL INVESTIGATION

1973

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ADC

SUBSOIL INVESTIGATION
335 ACRES
IN
J.S. DUFFOSAT CLAIM
8TH WARD
ST. TAMMANY PARISH, LOUISIANA

April 13, 1973

GILLER ENGINEERING CO., INC.

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ADC

J.S. DUFFOSAT CLAIM
ST. TAMMANY PARISH, LOUISIANA

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ADC

J.S. DUFFOSAT CLAIM
ST. TAMMANY PARISH, LOUISIANA

The soil from natural ground elevation to -5 feet at boring ADC-1 is predominately a soft gray fat clay with layers of sand and shells and from ground elevation to -7 feet to -10 feet at borings ADC-2 to ADC-6 is predominately a gray and white sand with traces of clay. The soil from -5 feet at boring ADC-1 to -10 feet is a very soft and highly compressible gray fat clay and peat and from -10 feet to -15 feet is a medium stiff gray and tan sandy clay. From an average depth of -8 feet to -15 feet at boring ADC-2, -20 feet at boring ADC-3, -15 feet at boring ADC-4, -15 feet at boring ADC-5, and -15 feet at boring ADC-6, is a highly compressible black peat and black and brown peat and clay. Below this stratum begins the Pleistocene formation. This stratum down to -25 feet is predominately a medium stiff gray and tan clay. Below this stratum to the depth of the borings is a medium to dense gray and yellow sand.

FOUNDATION ANALYSIS

Surface foundations exerting a net pressure of 900 pounds per square foot in the vicinity of borings ADC-2 through ADC-6 and 350 pounds per square foot in the vicinity of boring ADC-1 will develop a factor of safety of 3 against a shear failure in the soil with settlement less than 0.5 inches at borings ADC-2 through ADC-6 and less than 1.5 inches at boring ADC-1.

Because of the presence of highly compressible peat between -7 feet and -20 feet, it is recommended that only pile foundations be considered for relatively heavy structures. Therefore, piles driven to depths as tabulated below will develop a factor of safety of 2 against a shear failure in the soil with negligible long term settlement.

<u>PILING</u>	<u>TIP ELEVATION</u> (Ground Elev.=0)	<u>DESIGN LOAD</u>
#9 Pole	-30 feet (or refusal)	4 tons
#5 Pole	-30 feet (or refusal)	6 tons
Class B	-30 feet (or refusal)	12 tons

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ADC

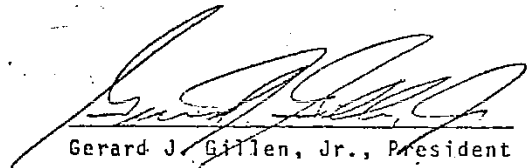
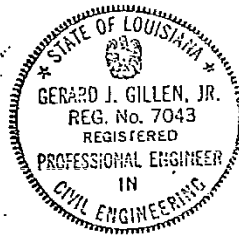
J.S. DUFFOSAT CLAIM

ST. TAMMANY PARISH, LOUISIANA

All timber piles should be treated with an effective preservative so as to prevent decay of the pile on the zone above the water table.

Respectfully submitted,

GILLEN ENGINEERING CO., INC.



Gerard J. Gillen, Jr., President

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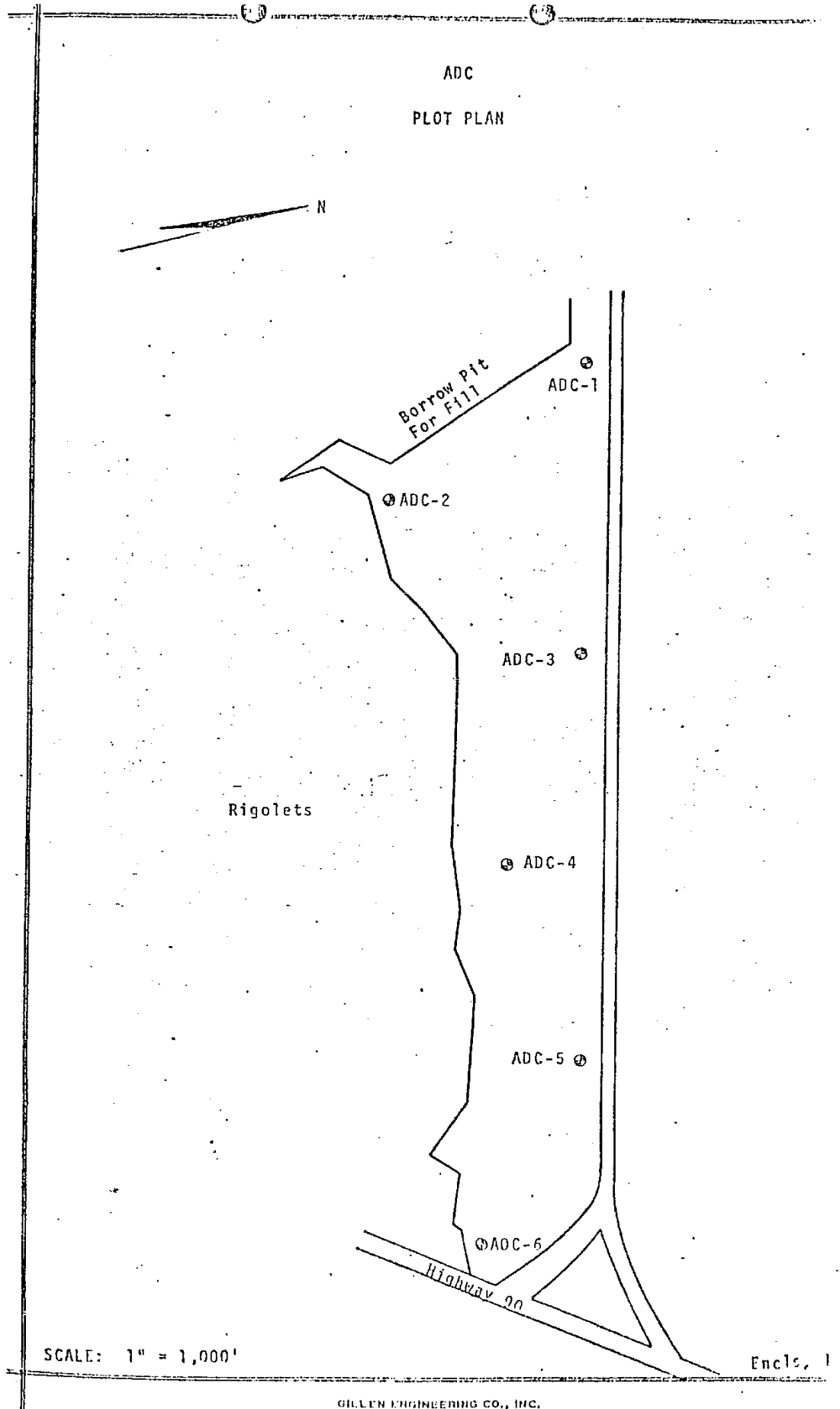


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J.S. DUFT AT CLAIM
 PROJECT ST. TAMMANY PARISH, LA. BORING NO. ADC-1 DATE 3/73

DEPTH GROUND ELEV. 0'	TRIAxIAL QUICK		CONSOLIDATION	ATTENBERG LIMITS		UNCOMPRESSED COMPRESSION TEST - PSF	WET DENSITY PCF	MOISTURE CONTENT	BORING LOG	STANDARD PENETRATION	GENERALIZED STRATA
	COHESION PSF	FRICTION ANGLE		LIQUID	PLASTIC						
						452	197	34	/ / / / /		SOFT GRAY CLAY WITH LAYERS OF SAND & SHELLS
5								46	/ / / / /		
								142	/ / / / /		SOFT GRAY CLAY & BLACK PEAT
10								89	/ / / / /		SOFT GRAY CLAY W/LAYERS OF BLACK PEAT
						1544	132	22	o o o o o		MEDIUM GRAY & TAN SANDY CLAY
15								24	. . . . .		GRAY & TAN CLAYEY SAND
20								25	. . . . .	
25								23	. . . . .	
30								30	. . . . .	
35								26	. . . . .	23	MEDIUM GRAY & YELLOW SAND
40								21	. . . . .	31	



* DRIVING RESISTANCE IN BLOWN PER FOOT DETERMINED WITH A STANDARD GUYT SPIKE HAMMER AND A 140 LB. DRIVING HAMMER WITH A 30" DROP

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J.S. DUFFIN & ASSOCIATES
 PROJECT ST. TAMM, PARISH, LA. BORING NO. ADC-2 DATE 4/1/73

DEPTH GROUND ELEV. D'	TRIAxIAL QUICK		CONSOLIDATION	ATTErICURU LIMITS		UNCONFINED COMPRESSION TEST - PSF	WET DENSITY PCF	MOISTURE CONTENT	BORING LOG	* STANDARD PENETRATION	GENERALIZED STRATA
	COHESION PSF	FRICTION ANGLE		LIQUID	PLASTIC						
									21		BROWN CLAYEY SAND WITH SHELLS
5									32		
									42		
10									29		GRAY CLAY WITH LAYERS OF SAND
									29		SOFT GRAY CLAY & BROWN PEAT
15						493	85	134	29		GRAY SANDY CLAY WITH LAYERS OF PEAT
20									23		STIFF GRAY & TAN CLAY
25						2353	122		23		
30									20	72	VERY DENSE GRAY & WHITE SAND
35									24	78	
40									26	76	

PEAT
 CLAY
 SILT
 SAND
 * DRIVING RESISTANCE IN BLOW PER FOOT AFTER MINED WITH A STANDARD WEEB BROWN SAMPLER AND A 140 LB. DRIVING HAMMER WITH A 30" DROP

EXHIBIT N - SUBSOIL INVESTIGATION 1973

J. S. DUMIC, T CLAIM
 PROJECT ST. TAMMANY PARISH, LA. DURING NO. ADC-3 DATE 4/77

DEPTH GROUND ELEV. 0	TRIAxIAL QUICK		CONSOLIDATION	ATTERBERG LIMITS		UNCONFINED COMPRESSION TEST - PSF	WET DENSITY PCF	MOISTURE CONTENT	BORING LOG	* STANDARD PENETRATION	GENERALIZED STRATA
	COHESION PSF	FRICITION ANGLE		LIQUID	PLASTIC						
5									•••		GRAY AND WHITE SAND WITH TRACES OF CLAY
								22	•••		
								23	•••		
10								29	•••		BROWN CLAY AND BLACK PEAT WITH TRACES OF SAND
								172	•••		
15						444	88	140	•••		BROWN CLAY AND BLACK PEAT WITH LAYERS OF CLAY
								144	•••		
20									•••		MEDIUM GRAY & TAN CLAY
						1714	102	43	•••		
25									•••		VERY DENSE GRAY & WHITE SAND
									25	96	
30									•••		
									25	110	
35									•••		
									23	190	
40									•••		

 PEAT
  CLAY
  SAND
  GRAVEL

* DIVING RESISTANCE IN BLOWS PER FOOT DETERMINED WITH A STANDARD DPLT DIVING SAMPLER AND A 140 LB DIVING HAMMER, WITH A 30" DROP

EXHIBIT N - SUBSOIL INVESTIGATION 1973

J.S. DEPOSEAT CLATH
 PROJECT ST. TAMMIE PARISH, LA. BORING NO. ADC-4 DATE 4/73

DEPTH GROUND ELEV. 0'	TRIAxIAL QUICK		CONSOLIDATION	ATTENDING LIMITS		UNCONFINED COMPRESSION TEST - PSF	WET DENSITY PCF	MOISTURE CONTENT	BORING LOG	STANDARD PENETRATION	GENERALIZED STRATA
	COHESION PSF	FRICTION ANGLE		LIQUID	PLASTIC						
5									24 28 22 20		GRAY SAND WITH TRACES OF CLAY
10						274	83	250			BLACK PEAT WITH LAYERS OF CLAY
15						1172	123	31			MEDIUM TO STIFF GRAY & TAN CLAY
20						2466	108	41			
25									21	108	VERY DENSE GRAY & WHITE SAND
30											
35											
40									22	150	

NAT
 CLAY
 SPT
 SAND
 * DRIVING RESISTANCE IN BLOWS PER FOOT OCCURRED WITH A STANDARD SPLIT BORING SAMPLER AND A 140 LB. DRIVING HAMMER WITH A 30" DROP

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J.S. DUFFY & CLARK
 PROJECT ST. TAMMAM, PARISH, LA. BORING NO. ADC-5 DATE 4/73

DEPTH GROUND ELEV. 0'	TRIAxIAL QUICK		CONSOLIDATION	ATTERBERG LIMITS		UNCONFINED COMPRESSION TEST - PSF	WET DENSITY PCF	MOISTURE CONTENT	BORING LOG	* STANDARD PENETRATION	GENERALIZED STRATA
	COHESION PSF	FRICITION ANGLE		LIQUID	PLASTIC						
									•••		GRAY SAND WITH TRACES OF CLAY
5								21	•••		
								26	•••		
								32	•••		
10								33	•••		BLACK PEAT WITH LAYERS OF CLAY
						242	89	240	•••		
15						1212	125	24	/ / / /		MEDIUM TO VERY STIFF GRAY & TAN CLAY
20						4067	126	31	/ / / /		
25									•••		VERY DENSE GRAY SAND
								22	•••	82	
30									•••		
35									•••		
40									•••	67	

PEAT
 CLAY
 SILT
 SAND

* DRIVING RESISTANCE IN BLOW PER FOOT DETERMINED WITH A STANDARD SIXT BPOON SAMPLER AND A 140 LB. DRIVING HAMMER, WITH A 30" DROP

